

Collection of Essays 2



S.K. Kulkarni



About the author

Professor S. K. Kulkarni, is a distinguished pharmacologist and an eminent pharmaceutical scientist and educationist of long standing. Former Pro-Vice Chancellor (DUI) and presently Emeritus Professor of Pharmacology, Panjab University, Chandigarh, Dr Kulkarni was earlier the Dean and Chairperson of the Faculty of Pharmaceutical Sciences. Professor Kulkarni has been recently (2020) identified by the Stanford University, USA as the top (Rank 1) pharmacologist of India with global ranking of 132 (amongst 100,000 top scientists of the world in 22 scientific fields and 176 subject categories) based on SCOPUS data-base ie; science publications, citations index etc. Dr Kulkarni is a Fellow of National Academy of Medical Sciences, National Academy of Sciences and the Indian Pharmaceutical Association and was the General President of the 53rd Indian Pharmaceutical Congress, and Secretary General of Indian Pharmacological Society.

Professor Kulkarni has authored text books in Pharmacology and Experimental Pharmacology. His recent book, 'Pharmacologists of India' covers the contributions of Indian Pharmacologists in the last seven decades. Professor Kulkarni has been decorated with several national awards and recognitions.

*Collection of
Essays*

(2)

S.K. Kulkarni

Salute to the Covid19 frontline warriors

Contents

1. Excitement of matric results!	09
2. Class of 2020: ‘apprehension in the air’	21
3. Growing up with cricket	34
4. Fatherhood, brotherhood and friendship	53
5. ‘ <i>Chai-pani</i> ’, invincible	56
6. The lost world found: Reconnecting with an old associate!	63
7. Reflections on the Development of Pharmacology in India (From 1949-2020).	76
8. A chat on Pharmacy education and research ecosystem*	91
9. Endangered species and the science of learning	96

10. Mango talk	102
11. Liberal thought!	109
12. Can India legalize medicinal use of Marijuana?	114
13. Blockbuster drug to cultural phenomenon	122
14. Pandemic and <i>Parle-G</i> biscuits	131
15. Advantage in adversity!	141
16. The beard that says it all!	153
17. French lilac to <i>panacea</i> drug!	159
18. Tryst with indigenous plants: <i>Ashwagandha</i> and <i>Turmeric</i>	168
19. The Two Theatres	184
20. Jabs (jobs) for all!	191
21. Covid19-related terminologies	200
22. Evolution of new concept of preventive medicine practice	212

Preface

It has been nearly two years that the world is experiencing a global health crisis. The World Health Organization (WHO) has described it as pandemic. The corona virus disease (Covid19) outbreak has hit the society at its core, not seen before in the last one hundred years. All segments of the society particularly the socioeconomically vulnerable ones have been gravely affected, many have lost their near and dear ones, old and young, lost livelihood and economically devastated. India is at the receiving end due to lack of understanding the severity of the pandemic, medical infrastructure, hospitals, medicines, masks, ventilators, PPEs and vaccines. Yet, due to timely interventions (lockdown) by the government, the selfless service and sacrifices of the Covid19 frontline warriors and volunteers the nation came out with less loss of human life during the first wave in 2020 but the super spreader

(mutated version of the virus) second wave in Feb-April 2021 devastated the nation, lack of hospital beds, medicines, shortage of medical oxygen and exhausted healthcare work force. Two 'Made in India' vaccines have come as a savior but in spite of huge population to be vaccinated, time involved in it and miss-information about the vaccines, the fight and the plight are still on to win the 'mysterious' enemy!

Like every walk of life education sector has been very badly affected. In these nearly two academic years schools, colleges and Universities have been closed and mostly didactics on online mode. School going children and college students in rural India has been facing difficulty due to poor internet connectivity, non-availability of computers, smart phones and getting accustomed to the new mode of education. Teachers are also handicapped due to lack of experience of coping with new mode of teaching. Board examinations, school annual examinations and competitive entrance

examinations to professional courses are equally compromised. Honorable courts are issuing directions to ease the stalemates. We are in what is called 'new normal' but do not know how long will this go or when will it end.

The present book addresses some of these and related contemporary issues in simple terms. The author also touches upon concerns about pharmaceutical and pharmacological profession. He writes at length about the emerging concepts of preventive medicine practices as new approach in national healthcare.

In the present testing times the efforts and commitment of Association of pharmaceutical Teachers of India (APTI) to bring out this book is commendable. The author expresses his deep appreciations for Dr Raman Dang, the Secretary of the association for his spirits to uphold the commitment in timely executing the

publication. The author also thanks M/s Ashok printers,
Bengaluru for their cooperation and elegant work.

July20,2021

S.K. Kulkarni
Belgaum

1. Excitement of matric results!

I called my sister in Mumbai to know the matric (Xth board exam) result of her grandson. She casually replied that her grandson had opted for no final exam provision and his result was informed by the school before the actual announcement by the board. There was no excitement in her voice. Wow, the new normal was in operation already, he had scored 94% like most of the students irrespective of exam or no exam!!

The first six months of 2020 were very difficult and unpredictable time all over, and India was no exception. Generally beginning from February till the end of May the schools, colleges and Universities are busy completing the syllabus and students would be busy with preparations for the annual examinations. In professional colleges, teachers would be busy marking or evaluating internal assessments, laboratory and field work submissions, completing attendance registers etc,

etc. At home parents will be equally tense and busy keeping kids in good humor so that they perform well in the annual examinations. This year (2020) all that was missed due to unexpected pandemic. For a while the school going children were happy that they would be having no annual examination at the present. No one had expected that both children and parents would be in for a long haul. All confusion of when and how the annual school exams will be held was put to rest as each state government pronounced its own guidelines for the schools and to the parents. As for the board examinations and entrance examinations for professional courses, Supreme Court of India asked the Education Ministry to complete the process by the end of September 2020 following strict Covid-precautions (norms). It is almost end of October no one knows when will the admission process be over and the new academic session 2020-21 commence. Festival season and mid-year vacations will soon begin in the middle of

all this confusion. At the end it will be a watershed moment.

It reminded me of my school days and the board examination. In 1946, the year I was born, our father, a government medical officer was posted at Sidhapur in Karwar district of erstwhile Bombay province. The southern four districts of Bombay province then called Bombay-Karnataka because the local language was Kannada. By the time I was 3 or 4 years of age, our father was transferred to a place called Talikot in Bijapur district of Bombay province. Strangely or loosely it was called royalseema, may be the adjoining districts to Bijapur constituted erstwhile Hyderabad province. After the reorganization of the states on the basis of linguistics or local language spoken, Bombay-Karnataka became part of then Mysore state. The local language became officially Kannada. As is true in our country, every 50 Kms the dialect changes, the Kannada spoken by people in old Mysore was much

different than the way we spoke Kannada in Bombay-Karnataka. It is almost 65 years since the reorganization of states, people in both North (new identity)-Karnataka and old Mysore people continue to speak Kannada with their accents. It is felt that the way people speak Kannada in North-Karnataka sounded little crude or harsh compared to old Mysore area. This is even visible in Kannada text (novels), art, cinema and literary works.

The four districts of North-Karnataka were considered to be backward districts for more than one reason, mainly monsoon-dependent agriculture-based livelihood, no electricity until late 1960s, no major Universities or medical or technical institutions in the region (first IIIT and IIT were established in Dharwar only 2015 and 2016, respectively), and frankly politically also suppressed. Ever since the formation of Mysore state (now Karnataka) no one from North Karnataka has served as Chief Minister of the state for

a full term of 5 years. North-Karnataka has been always at the receiving end. With privatization of education particularly Medical and Engineering education, Karnataka has been the hub of technical institutions. Bengaluru becoming the so called ‘Silicon Valley’ of country, the educated middle class from North Karnataka have seen prosperity. Besides, monsoon-dependent agriculture is now supported by dams and canals (irrigation) which has brought socio-economic change in farming community. Healthcare facilities have improved in this area in the past 4 decades or so.

In the beginning the school leaving exam (matric/SSC) in North-Karnataka was conducted as per Bombay province pattern. It took almost 8 years to have one common examination (1963) for the entire state called Secondary School Leaving Certificate (SSLC) examination. When I went to school we had 7 years of primary school and 4 years of high school. This is now

changed to 10 years of school (now called Xth exam) followed by two years of pre-University (now called X + 2 or in short +2) examination. Besides the state Boards (like the one in Karnataka) two all India Boards namely Central Board of Secondary Education (CBSE) and Indian Certificate of Secondary Education (ICSE) conduct both Xth and +2 examinations. Many government and private schools are affiliated to these Boards and follow the curriculum prescribed by them. The respective state Boards have their own curriculum. But the basic principles of education are the underlining commonality in all the Board curricula.

In 1963 I appeared for the SSLC examination which was conducted for the first time in the state of Mysore (Karnataka now). There were teething problems but process was completed after two attempts by the board. The school from where I did my matric was very small but known for quality education having very committed teachers in science and maths, did not have the board

exam centre. So, we had to go to a neighbouring town to appear for the exam. Unlike the present day system, the entire exam was finished in 4 to 5 days with daily two papers.

In those days fast mode of communication used to be either through telegram or via trunk call. Both the modes particularly trunk call used take at least one day and more. It was like ‘no news was good news’ and our parents would be tensed if there was a telegram or a trunk call which invariably brought sad or emergency message(s). In rainy seasons the local news papers would come one or two days late. We used to listen to All India Radio (AIR) for news and Vividha Bharati radio station for Hindi film songs. On Sundays the local radio station (Dharwar) used to broadcast some programmes for children. Before electricity came to our area our radio set was run on liquid battery (mostly used by the heavy vehicles) and it had to be charged every now and then. The radio broadcast was also not

24/7; couple of hours in the morning and in the evening. Though our father was a government medical officer, neither the hospital nor our residence had phone connection. In fact our parents did not see phone in their home in entire their active life. One has to make a special effort make a telephone call. It was always done in an emergency. Someone would go to post office and book a trunk call in the name of the receiving party and wait for several hours and sometimes days for the trunk call to materialise! Majority of times the receiving party would also not be having telephone connection in their homes. The post office would send a messenger to the party to inform about the trunk call. Then the whole process of reconnection used to take place (unbelievable in modern times). Telegram (now the government has discontinued with telegram provision) communication was much simpler. One had to go to post office and give the written message in telegraphic language (in

brief as each word was charged) and leave it or assume that the message would be delivered in a day or two!

Since my matric or SSLC exam was first of its kind in the state of Karnataka and our school being small one, we were told that result sheet would come to district or taluka headquarters first and the school would get it a day later or so. There was no way to know the results. The excitement was building up and I was waiting for our uncle or someone who knew my roll number would send telegram. On the second day I went to the post office and booked a trunk call to find out the results. I spent almost entire working day at the post office but the trunk call did not get connected. On the third day both my school got the results as well as I got a telegram from my uncle. I had secured distinction in the exam. The wait was over and it was time to celebrate it!!

By the time our second son appeared for his Xth CBSE board examination (2002) things had changed, we had

Excitement of matric results! / 18

phone and internet connections at home. His result was to be declared a day later, but his classmate called in the middle of the night to break the excitement, as our son had secured first rank to his school. As the day broke, he got a call from the school and his photo with performance details appeared in all the local news papers. These days this excitement is not there anymore as the candidates get the results by email or mobile sms-message (short message service) almost on the same day or even a day before. This year (2020) many students opted for no exam provision and were sure of their success that too inflated scores (based on extrapolation of performance in their internal assessment or school periodical examinations). We have moved from no communication era to instant or excess (social media!) communication!!

Post script:

In 1974 I left for Paris, France for postdoctoral assignment. My parents saw me off at the local railway

station (Bagalkot) in interior of North-Karnataka. The day I took off from Mumbai by Air India flight to Europe, right at the Bombay airport I was told that the flight may over-fly Paris due to local problems. It was my first journey abroad and that too to a country where communication in English was not welcome! On the flight it was again announced that most probably the flight would not land in Paris airport as there was a nationwide strike in France. There were a few passengers who were to disembark in Paris. Further the steward told that they over fly us to London and bring us back to our destination. We had no options but to wait for things to take place. We were relieved when it was announced that we would be landing in Paris. At the arrival I was expecting someone from my Professor's lab would come to receive me as I had informed the professor about my itinerary but no one was there. The Orly airport was deserted and no taxi or metro services were in operation due to strike. I was not conversant with French and took the airline bus

services to reach down town. From there, somehow I managed to reach '*École de Médecine*', 15 Rue Paris 75006. The office of the Professor had not received my communication due to postal strike and he was also out of country. The secretary to the Professor (a French lady couldn't speak English) got hold of someone who spoke in English to help me. The first thing I wanted to do was to send a telegram to my parents about my safe arrival in Paris. But the secretary told me that all postal communication services were shut down due to nationwide strike. She further advised me not to post any letters until the time the strike was called off. It took three months for me to write a letter to my parents that I was hale and hearty in a foreign land! One could imagine what must have gone through the minds of my elderly parents, particularly my mother. They had missed the excitement of knowing that their son had made it safely to a foreign land!

2. Class of 2020: ‘apprehension in the air’

‘A Lucknow girl scores 100 per cent marks in Class XII board examination’ was the news paper headline. The news headline went on to say that Divyanshi Jain scored 100 percent marks in all the five humanities subjects that she appeared in and was given 100 percent marks in her geography exam which was cancelled due to the ongoing public health emergency. Another news brief was about a pair of identical twins scoring exactly the same marks in each of the subjects that they took the exams in. Interestingly, the identical twins have same intelligence quotient (IQs) and that their genes played a role in their performance!

State board examinations and results were no different than the national board exams. The minister in charge of primary and secondary education of Karnataka said

Class of 2020: 'apprehension in the air' / 22

that in spite of nearly 100 days no classroom teaching and revision exercises due to pandemic, the pass percent was almost the same as in the previous year(s) and more than 300 students scored 99%; including 6 scoring a perfect 100%! In corollary, the worthiness of the (CBSE or the State boards) results almost competed with events like the onset of the southwest monsoon, the budget and a stock market collapse; it is nerve wrenching for lakhs of students and their families. Similarly, this year over 7.7 lakh (out of the over 13.66 lakh) candidates have qualified in the NEET (National Eligibility Cum Entrance Test) for admission to medical colleges. An Odessa boy and a girl from Uttar Pradesh have scored a perfect 100% score. Such performances were unheard in our times (say 60 years ago)!

A person's performance in these two examinations has become a benchmark for their academic competence. For lakhs of students, success or failure in these exams

is the key determinant of their self-worth. The nationwide exams conducted by the CBSE are a mammoth task in logistics and planning, more so this year to follow the Covid-norms of observing distance in seating arrangements, providing masks to all candidates and sanitization. Almost the examination centres were doubled as commuting was a big handicap due to non-availability of local buses or rail services. More than 30 lakh students from across the country appear for these examinations. To reduce the risk of paper leakage, many sets of encrypted question papers are sent to the examination centres, including some in very remote areas. The range of subjects is mind boggling—in 2018, a student could choose from 800 subjects ranging from the mundane physics, economics etc, to esoteric ones like olericulture and confectionery. The fact that the whole process is completed year after year, without any major glitches is a testament to the organizational abilities of the CBSE or to the state

Class of 2020: 'apprehension in the air' / 24

boards, particularly in the present circumstances, kudos to organizations!

In this whole mega exercise of logistical and organizational competencies of the CBSE or state boards, unfortunately we forget about the most important aspect of this exercise year after year (this year students and their parents went to Supreme Court questioning about holding of the exams during pandemic), ie; academic content, quality of its delivery, learning abilities across the board and evaluation processes. The Boards both central and state are responsible for maintaining academic standards in quality of teaching and assessment. These inflated scores or marks (this year some of the exams were not held due to Covid-19, yet students scored 100%) do not go well with either the evaluation and moderation process or corroborate with the intellectual competencies of students. No logic behind the inflated scores could explain but for only one overriding goal to

ensure maximum number of students pass and also secure high to very high marks. When the state education minister gives a statement that there was no teaching for nearly 100 days, one may question whether entire syllabus (topics) in each of the subject was covered or not, and equally the question papers represented whole of the course-contests? Perhaps ours is the only country where questions are asked in the parliament and in state assemblies over the difficult questions in maths or science papers and out-of-syllabus questions. (There is already a move to cut the syllabus for 2020-21 academic sessions as classes have not effectively started even in the end of September 2020).

The same is true with college or University examinations 2020. Some state governments wanted to pass the final year students in all courses including professional subjects like medicine, dentistry, pharmacy, management, engineering and architecture.

The clinical training of interns which is mandatory to acquire firsthand clinical experience and exposure after the final MBBS exam has not happened all over the country as the Out Patient Departments (OPDs) in many hospitals were closed or there were poor patient attendance. In many states like Maharashtra intern doctors (before they were administered Hypocrites Oath and registered with State Medical Councils?) were called in for Covid19-duties. Some of these Covid-warriors have contacted the infection. Many medical and dental students have returned to their homes since the beginning of March 2020 due to Covid19 and their bedside teaching and learning, and hospital rounds have not happened in the last 8 months although on papers they are attending online classes. How online clinical rounds can happen and how these medical students would become competent clinicians in their professional career- is a million dollar question (two of our relatives pursuing medicine staying at home for the past 12 months or so, one just completed

his final MBBS 2021 exam in first class; everything from clinical examination to surgery etc online; the other has not been able complete course, of course online due to pandemic). What would be the future of these Covid-year graduates of medicine who have not examined a single patient; some will pass NEET and take admissions to become specialist? Same is true with PharmD, clinical Pharmacy and pharmacy practice students and their careers. Recently one of the NITE professors told that the 7th semester had not started even at the end of December, 2020 and they had plans to condense the course in to one month package to complete the semester by February 2021. The 8th or the final semester will be completed as per schedule in April-May 2021; so that the students of 2020-21 batches will not lose any time.

Before the pandemic I attended one meeting of the 'Margadarshaks' at the Council's headquarters in New Delhi. In the opening statement the official referred to a

letter received from the ministry which was about the *'fake engineers'* deported from the Gulf countries. The government had expressed great concern over the quality of young engineering graduates who have degrees but no technical knowledge and skills. The 'fake engineers' was a reflection of the state of mushrooming of professional colleges and falling standards of technical and professional education in the country. The captains of the industries always say that there is miss-match between what is taught in the colleges and Universities and what industries expect from the graduates. In the process a lot of de-learning and re-learning takes place at the expense of time, training and cost. Majority of the teachers have no exposure to industry and they teach only theoretical aspects. Students rarely have industrial training during their college education and pandemic 2020 have further added more complexities. Barring the big leagues like IITs and IIMs which have internship programmes, engineering and other professional colleges across the

country have no such provisions. The industries cannot provide training to lakhs and lakhs of students year after year coming out of sub-standard institutions.

The class of 2020 more specifically the professional graduates of 2020 will be assessed for their competencies in the coming years say a 5 to 10 years from now. Will they be called half-baked professionals or incompetent, or will they survive the rigorousness of the professional requirements and competitiveness of jobs in India or abroad? Exceptional individuals and highly self motivated students like the Pune boy Chirag Falor, topper of JEE advanced (2020) who has already won the American Mathematics Competition (AMC-10) 2019, the Homi Bhabha Balvaidnyanik competition and received President's Bal Shakti Puraskar 2020 will any way make it to the top. Chirag has already received admission to the Massachusetts Institute of Technology (MIT), Boston USA and he has forgone his admission to the prestigious IITs. But majority may face tough

Class of 2020: 'apprehension in the air' / 30

professional challenges unless government or respective Councils like Medical and Dental Councils or AICTE come up with remedial measures to equip these professional graduates of 2020.

After long wait and anxiety, on June 1st 2021 the government of India announced that there will be no CBSE and ICSE Board examinations for the class XII students. The state Boards are likely to announce their decisions in line with the CBSE/ICSE Boards. Unfortunately the 2nd wave of Covid19 has turned out to be super-spreader variant and more virulent and affecting younger people. The decision of the government is in the right direction as lacs of students would have undertaken the risk of exposure as the examination schedule generally runs in to several days to weeks. The nation does not want to take a risk of exposing these students to the deadly virus. Moreover, less than 18 years of age kids have not been vaccinated yet. It is not going to happen in the very near future,

say in a month or so. Government has yet to make policy decision pending the availability of vaccines. The situation is more critical as the infection is fast spreading in rural masses (April 2021) where health infrastructure and the availability of the vaccines are sparse. Moreover vaccine hesitancy and false propaganda are preventing the speed of vaccination both in rural and some parts of urban population. There is acute shortage of doctors, nurses, paramedics and hospital infrastructures. The medical professionals are debating for preparing the final year nursing students and intern doctors with Covid-management training and induct them in to frontline to tide over the emergent medical situation, if it arises.

Year after year we read many bright engineering graduates go abroad for higher education and even for jobs in gulf countries. Due to travel and visa restrictions as well as final year exams have not been completed in some of the Universities this year (2020-

21) not many graduates will not be able to go abroad for higher studies. Some of the major Universities across the globe have online classes and have discouraged foreign students to take admissions due to pandemic. They have testing times ahead.

Thomas Edison once said, 'I have not failed, I have just found 10,000 ways that won't work'

Post script:

2021 results of II PU (XII) class have been declared by the Karnataka board. This year board examinations were not held due to 2nd wave of Covid19. To overcome the apprehensions, the government appointed a 12 member technical committee has finalised the results declaring 2239 students scoring a perfect 100% (unheard before!) and nearly 90% of the candidates clearing the II PU. The minister in-charge proudly announced that college seats will be increased to accommodate all the successful candidates!

Similarly, ICSE Xth results record 100% success while only one failure in XIIth exam (99.06%). CBSE results are no different. The students seldom went to schools and never took the final exams! Grade inflation epidemic may prove to be a disaster for higher education system in the coming years.

3. Growing up with cricket

Cricket bat, leather balls and listening to cricket commentary on radio were part of our growing up! But cricket was not the only game kids played back then. We played several games like marbles, gilli-danda, and kite-making and flaying, ring (tennikoit), swimming, kho-kho and kabaddi (in school) regularly. These were like seasonal games in the sense we did not play all these game all the time. I also had a brief stint with tennis. All of them were outdoor games. It's sad that many of these games are not known to present day kids. They (kids) have no time for any of the outdoor activities, thanks or curse to television and mobile games!

Think of it cricket is not an Indian sport. In many sense it is a colonial game as British took the game wherever they ruled. Cricket was like a rich man's game, mostly played by the county clubs in England and clubs in

Bombay and some of the princely states of Baroda (Gaekwad), Saurashtra (Rajkot) and Indore (Holkar) and some other. Former Maharajas had their education in England and encouraged the game in their princely states. It is well known that Maharaja Gaekwad of Baroda took the Indian team to England for a series. He captained the team and subsequently his son and grandson played for India. Baroda and Saurashtra though part of Gujarat state have exclusive representation in the domestic season even today. Somehow the Maharajas of South like Mysore did not play the game. Even after the independence the game was confined to clubs in Bombay or in princely states of Baroda (Gaekwads) or Indore (Holkars). Test matches were the only international cricket played that too once in a while (2 to 3 year gap) at select venues. The Indian team was not considered to be strong enough to sustain five day encounters. Most of the players used to be from Bombay, Baroda or other earlier princely states. Moreover the team lacked

genuine fast bowlers. There was no television coverage then but in the cinema halls before the main movie was screened Government news reel used to be shown for 15 minutes which would cover sports including highlights of cricket matches. Of course radio commentary was very popular. Radio commentators like Vijay Merchant, Vizzy (Maharajkumar of Vizianagaram), Berry Sarbadhikari, Dicky Rutnagur, Narottam Puri (ENT surgeon by profession) and his father, and Jasdev Singh kept the listeners spell bound with ball by ball commentary, statistics and the anecdotes. Our father who had education in Poona (Pune) and Bombay (Mumbai) used to talk about the great cricket players like Vijay Hazare, C. K. Naidu, Mustak Ahmed, Lala Amarnath, Vijay Merchant, Dattu Phadkar, Vinoo Mankad, Ghulam Ahmed and some more names. In one of his trips to Bombay father got us a cricket bat. Back then cricket bats used to be seasoned with oil before we actually used to play. As youngster I have vivid memory of listening to radio

commentary of the 1958-59 home series against West Indies. West Indies team was led by Gerry Alexander (wicketkeeper captain) and it had fast bowling greats like Wesley Hall, Charlie Griffith and Roy Gilchrist who wreck the Indian batting line up. The series was a disaster as India did a miserable performance with the bat but some consolation as the Indian leggy Subhash Gupte captured nine wickets in an innings in the Kanpur test. The series saw for the one last time some of the greats of Indian cricketers like Vinoo Mankad (captained Madras test), Hemu Adhikari (captained Delhi test), Ghulam Ahmed and Poly Umrigar (captained Bombay test). Another cricketer whom we followed closely was Bapu Nadkarni known for his maiden overs. Many years later in 1963-64 Karnataka University hosted inter University cricket tournament at Dharwar. The Bombay University was lead by Ashok Mankad, son of Vinoo Mankad and they were staying in our hostel.

For the first time a Ranaji trophy (Ranji Trophy tournament named after one of India's first test cricketers, Ranjitsinhji, who played for England, is a domestic first class cricket series played amongst various state teams. Maharaja Bhupinder Singh of Patiala had donated the trophy in 1934) match was played in Dharwar in 1959 at the Govt High school ground between Mysore and Madras states. My elder brother and I went to watch the match. Mysore team did not have any known cricketers but Madras team had well known spinner VV Kumar and Singh brothers, Kripal Singh and Milka Singh. All of them had played for Indian team. There was a craze that we collected cricket (match) pictures from the English news papers and made an album!

In the early 1960s Ceylone (now Sri Lanka) played unofficial test matches in India. I witnessed the first match played at the Central College grounds in Bangalore. The Indian team had well-known players

like Jaisinha, Sardesai, Hanumant Singh etc and upcoming Chandrashekhar the wrist-spinner. India won the match.

Some times in 1971 I travelled from Jaipur (where I was perusing PhD research) to Bombay. Both my elder and the younger brothers had arrived for personal work. A test match between India vs England was being played at the Brabourne stadium. We happened to be in Charchgate area, after the sumptuous lunch at the famous Purohit restaurant we managed to see the post lunch session. The match ended in a draw.

Invention and acceptance of Karry Packer's Channel nine (Australia) World Series in 1977-79 broke the traditional concept of white uniform and red ball cricket to colored uniform and white ball cricket; and revolutionized the game from day time event to evening-night extravaganza. Around that time two major things happened in the country namely, India winning the third version of the cricket World Cup

Growing up with cricket / 40

(WC) in 1983 which was played in England and the invasion of television sets in our homes. Cricket became a 24/7 event and no one had imagined that in a short period of time it would be followed by young and old, men and women, poor and rich to an extent that it is a religion! Some of the players are worshiped like dummy -gods!!

When our younger son Girish was growing up, like many kids he was also in to cricket. He would copy bowling actions of Harbhajan Singh or Anil Kumble. He joined cricket coaching and a time came to decide between cricket as a career (very tough choice, one billion competitors for only eleven spots in the team) or his academic pursuits. He did the right option of becoming a scientist-entrepreneur.

The arrival of rustic cricketer Kapil Dev of Haryana on the cricketing arena in India broke the stereotype of Bombay-brats. Known as Haryana-hurricane, Kapil became national icon after captaining the World Cup

(WC) winning team of 1983. Kapil hardly spoke in English and his rural background encouraged many young kids to play not only cricket but also become fast bowlers. The 1980s saw the emergence of another national icon of the game, Sachin Tendulkar, a gully-(street) player coming from a middle class family who entered the national cricketing arena at a tender age of 16, facing some of the fiercest speedsters of the time in the game and creating history. Sachin over the years became ‘Cricketing God’.

But the real turning point was the beginning of the new format ie; shortest addition of the game called T20. Twenty over game and the contest between the two teams would get over in just 3 hr or so. The format had its origin in Yorkshire, England (2003) where it became a popular evening game (after the work hours). The cricket establishment in India did not favor the game until 2007 when the international body (ICC)

announced the first T20 World Cup to be played in South Africa.

Around this time most of the senior players were taking retirement from the Test (5 day format) cricket and players like Sachin, Sourav and Dravid for reasons best known to them expressed their reluctance to play T20 WC. Mahendra Singh Dhoni, a boy from Ranchi, Jharkhand (not known for mainstream cricket playing cities or states) and who had just played a few ODIs was chosen by the selectors to lead the young Indian team. Dhoni also became the first wicket keeper Captain of the Indian team. Until then India had played in only one competitive T20 game. In a remarkable or unexpected turn of events, India swept the tournament, beating their traditional rival Pakistan in the finals. Holding aloft the trophy, Dhoni with long locks became new cricket hero in India connecting with youngsters who identified with the WC winning hero. No one thought that new generation of cricketers would

emerge from interior of the country. It was the beginning of the new generation of cricketers in the country.

A year later a little known cricket administrator from Rajasthan, Lalit Modi master minded the commercialization of the shortest format of the game in to an evening extravaganza for the hungry Indian audience. Indian Premier League (IPL) was born and now flourishing into its 12th year annual event. A couple of things have happened with the emergence of IPL. **Firstly**, the cricket administration, BCCI (Board of Control for Cricket in India) has become the richest and most powerful body in the world cricket; **secondly**, it has broken the barriers of big-city cricket concept as several players emerging from rural India (UP, Bihar, Rajasthan and many other states where cricket was not a popular event) who are now considered to be the fastest bowlers in the game; **thirdly**, each team have mix of experienced foreign and Indian players with

budding Indian kids who would otherwise never get the experience of learning the art of the game. It has also broken the barriers of rich and not so rich, convent educated and commoner and most importantly, many of them made it to the national team on their merit. The cricket administration has a talent hunt activity now. **Fourthly**, all players are paid handsomely by the franchises; and **lastly (fifth)**, the cricket administration (BCCI) started supporting the creation of infrastructures (stadium) in each state. As a result nation has many new stadia. It is heartening to see many kids have taken up the game and several coaches and cricket academia have come up. Thousands of people come to watch the matches after work in many newly built cricket stadia and millions watch the game round the world at home on television screens and on smart phones. The players wear colored clothes. The matches often have nail biting finish. No one had imagined that the T20 game would acquire such phenomenon baring class creed; language and region

barriers in our country. People who called the game ‘tamasha contest’ have become franchise and player-followers. Life has come full circle with T20, a 21st-century entertainment transforming the evenings of players and fans alike.

Legend to follow: When Dhoni won the T20 WC (2007) he was just 26 years of age and captaining one of the most demanding and toughest jobs any one could imagine, one billion followers of the game and equal number scrutinizing every move he and his teammates make on the ground. Youngsters idolized his persona, long locks, his workout routines and drinking six mega glasses of milk! He was the first captain and also wicketkeeper captain of the Indian cricket team coming from interiors of India. Before him most of the captains came from big cities like Bombay, Delhi, Calcutta, Chennai or Bangalore. He didn’t play textbook cricket, invented his own shots (now known as helicopter-shot), exhibited tremendous physical (rustic strength) ability

of exemplary running between the wickets and most importantly, he didn't exhibit emotional outbursts in victory, defeat or getting out and otherwise so common in big town boys. Dhoni's last ball six in the 2011 WC match has become signature shot for finishing the game. In fact he has been known now as the best 'finisher' of the game, almost in every match that India has played since the 2011 WC. The captains generally have people on whom they have confidence in the team. Dhoni groomed several youngsters like Raina, Jadeja, Bumrah and others to become match winners in the team. His cricketing sense exhibited 'out of box thinking' as he would hand over the ball to such bowlers like Joginder Sharma (2007 T20 WC) or Nehra (in ODIs) to deliver the last over of the match in a nail biting finish. Senior players like Sachin, Shewag and Harbhajan played under his captaincy until up to winning the ODI WC in 2011. Senior players were not only comfortable but so was Dhoni who respected their presence and guidance. Standing behind the stumps he

was calm and composed, never showed any emotion either in winning or losing the contest. Unlike many captains across the globe, he had no controversy either with the team manager(s), umpires, support staff or the BCCI. The cricketing fraternity and fans soon to recognized him as ‘**captain cool**’. He was honored with Civilian award of Padmabhushan by the Government and also holds honorary title of Lieutenant Colonel in the Territorial Army unit of the Parachute Regiment (106 Para TA battalion).

In the ongoing version of 2020 IPL in the UAE, it was a spectacle to see how the young and prolific opening batsman of another franchise, Prithvi Shaw was silently listening to the legend Dhoni almost 20 years senior to the budding India cap before the match. And during the match the wicketkeeper captain legend was blowing in the eyes of the opener Prithvi to remove the insect. He has been speaking to other young cricketers (mostly coming out of the Under-19 WC team) of different

franchise. These distinctive characters make the legend to stand out and to emulate.

Before Ranchi became capital of Jharkhand, it was known as summer capital of Bihar and for mine ore industries. In the 1990s I used to visit Birla Institute of Technology located at Mesra-Ranchi about 20 km from the main city. It is a residential institute and mainly known for engineering sciences and it also houses pharmaceutical sciences department. Then Ranchi was served by a small airport and once I had to spend the night at a private guest house as there was Ranchi bandh and could not reach the BIT campus. Today being the capital of Jharkhand state and home of Mahendra Singh Dhoni, it houses an International airport and cricket stadium (2011) where international matches including test matches are played. It is also playing stadium for the franchise (Chennai Super Kings) for which Dhoni is the captain!

Dhoni- a case study in business and management schools: Mahendra Singh Dhoni announced his retirement from all formats of international cricket on 15th August 2020. This was expected by the cricketing community for some times as he had already retired from the test cricket. Perhaps he was keen to play ODI WC 2020 in Australia which got postponed due to pandemic. The uncertainty must have made him to hang his boots once for all from the international events. He however, didn't completely disappoint his IPL followers as he still continues to be the Captain of the Chennai Super Kings. People from all walks of life and the media eulogized about his career. The Prime Minister Shri Narendra Modi paid rich tributes on the career and the contributions of Dhoni through a personal letter to the legend. He wrote, '130 crore Indians were disappointed but also eternally grateful for all that you have done for Indian cricket in the last decade-and-a-half;....., You have been one of the most successful captains, instrumental in taking India to the

top of the world charts. Your name will go down in history as being one of the world's batting greats, among the greatest cricketing captains and certainly one of the best wicketkeepers the game has seen...., Your dependability in tough situations and your style of finishing matches, particularly the 2011 World Cup Final, will forever be etched in the public memory for generations....., The correct way to assess your impact is as a **phenomenon!**' Further, 'Rising from humble beginnings in a small town, you burst onto the national scene, made a name for yourself and most importantly made India proud. Your rise and conduct thereafter gives strength and inspiration to crores of youngsters who like you have not been to cushy schools or colleges, neither do they belong to illustrious families but they have the talent to distinguish themselves at the highest levels. You have been one of the important illustrations of the spirit of New India, where family name does not make young people's destiny but they make their own names and their own

destinies.’ ‘Where we come from does not matter as long as we know where we are headed — this is the spirit that you have exuded and inspired many youngsters with’ unquote.

The other eulogy of great significance was from none other than Shri NR Narayana Murthy, Founder and Chairman Emeritus of Infosys Ltd, Bengaluru. He drew parallels stating, “Dhoni and Infosys were born on the same day, ie; 7th July 1981! There was something more than just performance that Dhoni brought to the table, he ignited the minds and raised the aspirations of 1.3 billion Indians- rural and urban, rich and poor, sophisticated and rustic, highly educated and illiterate. Every Indian identified with him. Dhoni is a quintessential leader; there is much to learn in corporate India from just watching his cricket matches!”- Unquote.

The underlying fact that Dhoni phenomenon exhibited 'level-headedness' in win or loss of the match, tournament final or for that matter in corporate business qualifies 'Dhoni- a case study' for business and management schools across the globe.

Post script:

Of late I have started following the Indian women cricket team which is performing well at the international level, in fact in all the formats of the game. Some of the girls coming from interiors of the country are in the squad. Seventeen year old Shafali Verma of Haryana is a sensational bat to watch.

4. Fatherhood, brotherhood and friendship

Narayana, Narasinha and Krishna.

They are fathers and father-figures. They are brothers.

They are friends.

Narasinha and Narayana draw their strength from Krishna. Krishna stabilizes the trifecta and makes it robust. Krishna stays behind long after Narasinha and Narayana retire to their heavenly abode in that order. After all, Krishna is the youngest, Krishna is the strongest and Krishna is a leader.

Krishnacharya Vitthalacharya Shivangi (KVS) for 88 years is duty bound as a venerable lawyer, heroic in his way of life and survives a knife-attack when disarming a convict, an advisor to everyone who comes to him, quick-witted and compassionate in the same breath as he makes people around him open up with laughter and

a staunch partner to Lalita with whom he raises his own family and supports the entire clan.

No wonder, Krishna is entrusted to harden the next generation as he stays behind in the world after Narasinha and Narayana.

Krishna is a father and becomes a father-figure to his clan's following generations. I call him Kittu-Kaka-Ajja. Kittu, affectionately for Krishna. Kaka, his relationship as a paternal uncle to my mother. Ajja, generationally my grandfather's generation. His influence pervades through generations. In calling him Kittu-Kaka-Ajja, I find a sense of being protected through layers of generations.

Krishna is a brother. He knows generational hierarchies need to be transcended to connect with the following generations. I always find his brotherly affection for me when he makes every attempt to bridge the

generational gap and see the world as I see it. He shares a joke and laughs out loud. He is genuinely interested.

Krishna is a friend. His consistent demeanor — compassionate and open-minded — creates trust that only friendship can create. After all, consistency over time is trust. He meets me with a hug every time, a hug that envelops me completely. And when he hugs me, I feel the warmth of his body. I smell the sweet scent of tobacco leaves that he savors. I know that I am with a friend.

Krishna is with Narayana and Narashinha once again, today and forever.

I will miss you ‘Kittu-Kaka-Ajja’

Contributed by Setumadhav Kulkarni

5. '*Chai-pani*', invincible

Setu (Setumadhav alias Anup) our son, was visiting home on a short college vacation. He wanted to get his maiden passport. I called my travel agent to process his passport application and we provided necessary documents of Setu and the fees. This was sometimes in early 2000 or so and the govt had announced that passport could be obtained in 15 days. The passport office had just moved to a new location in sector 34 business complex of the Union Territory (UT) of Chandigarh. We were anticipating police verification to happen very shortly so as to get the passport in 15 days. Eight days passed nothing was heard. Setu's return journey was nearing and he was anxious about the police verification before he left for his college. That didn't happen; neither the police verification nor receiving the passport.

Some days later Setu called to know the status of his passport which he badly needed. Next day I went to the passport office to find it out. The interview time was between 10 am to 11.30 am. There was a long queue and I thought that my turn would not come before closing time. To my surprise the queue moved very fast, the officer was disposing off the grievances of the applicants very fast. When my turn came, I narrated that it was more than three weeks and we had not got the passport of our son and not even the police verification. He looked in to the system (computer) and said, 'Oh! Setu's police verification had been referred by mistake to Punjab'. He promised to reschedule the verification process. He further said that if it was so urgent for identity purposes but not for travel overseas he could issue the passport immediately with travel restrictions. I said that it would be nice if he did so. He pulled out a special form and asked me to fill it and get it counter signed by an IAS officer. He further said, if I could bring the form by 2 pm on that day, the passport

would be issued in person by 4 pm! I thanked the officer and returned to my office.

I knew one lady IAS officer who was posted as registrar in the premier institute of PGIMER in Chandigarh. She had once come to my office for seeking inputs on pharmaceuticals. I called her and explained the situation. She was more than happy to do the needful. Within an hour Setu's emergency application was turned in at the passport office. To my surprise the passport was issued that evening with travel restriction rider.

On graduation Setu got an overseas job and wanted his passport to be updated. We resubmitted his passport to the passport office and requested for completion of police verification. One evening when I came back from walk I saw two police officers in plain cloth waiting in the lawn. I completed the formalities of showing my identification and got the signatures of two neighbours. I thought the procedure was complete. But

they wanted to see Setu in person. We told them he works in Bengaluru. They told that the verification would be done by the local police there and they would forward his application to his current address. Our request went in to deaf ears. We gave them his contact address in Bengaluru.

It was another story of getting the verifications done in Bengaluru, our son had to visit the local area police station and arrange for their '*chai-pani*' (bribe). It was a great ordeal to get the valid passport at last!

In the last few years things have definitely changed, changed for good. Post superannuation we were in Kalina, Mumbai for few years. One summer we were planning to go to USA. I realised my wife's passport had expired. I called the travel agent serving the institution. The lady took the expired passport of my wife and got us an appointment after two days at 8.30 am at Andheri, Mumbai passport office. I was wondering how come govt offices opened at 8.30 am, I

meant so early. We learnt that the entire operation was now out-sourced to TCS. We were there at 8 am and I told my wife to return home on her own as I had to attend a meeting at 9.30 am that day. No sooner I reached my office I got a call from my wife saying that she had returned home! What surprised me more was that in the afternoon she received the renewed passport by courier service!! That day evening we got a call from the Kalina police station for passport verification. We visited the police station a day later to complete all the formalities. Wow! What a change, no '*chai-pani*'.

Two years later I got my passport renewed much faster being a senior citizen!!

The other day (Covid-times) our son Setu who now lives in San Francisco, called to tell that he had applied for renewal of his passport and his application had been referred to Belgaum (where we live now) police for residence verification. He wanted me to follow it up and mentioned that police may need '*chai-pani*', a

difficult task for me to perform. I down-loaded the information sent by him. To my surprise the police station mentioned in the application was not located in the city jurisdictions of Belgaum; it was (Khanapur) 22 kms away from my residence. In the afternoon we drove to Khanapur police station. I told the lady officer the purpose of my visit. She directed me to meet the in-charge officer who was up-loading some information on the desktop computer. He looked in to his smart phone which had handy information and confirmed that they had received the documents from abroad. I showed him my identity and residence proofs (Aadhar card). He was helpless to verify the documents of our son as our residence was not within Khanapur police station jurisdictions. All he could do was forwarding the information to Belgaum city police station requesting them to further transfer the information to area police station where we are residing. I returned home thinking that it was not an easy process to materialize very fast.

To my utter surprise, next day morning I got a call from our local area police station to visit the office with passport size photo of our son along with residence proof (Aadhar card). I was anxious about the ***'chai-pani'***. But it was a shocker, the lady police officer had all the information on her iPad and took photo of our residence proof, photo of Setu and said, 'It will be sent online to San Francisco office from where the inquiry had come'. I thanked the lady officer!

In less than 10 min I was back home. Amazing transformation of police stations and the attitudes of the officers!! In the next few days Setu informed that he received his renewed passport!

No ***'chai-pani!'***

6. The lost world found: Reconnecting with an old associate!

We were sitting next to each other in the waiting lounge of the Palam airport (now renamed as Indira Gandhi International Airport, IGIA) for the early morning flight. Our destinations were different. I said ‘hello’ and introduced myself to break the silence. In reply he smiled and introduced himself as Professor Virendra Kumar from Chandigarh. ‘What a coincidence, I am also from the same place’, I said. As our conversation moved forward we discovered that both of us were from Panjab University and our departments were located just opposite to each other (separated by the Scout building). I would cross his Department of Laws everyday yet had no occasion to visit the department or meet. I was much a junior colleague and relatively new to the campus. Moreover our disciplines were different and no commonality!

The lost world found: Reconnecting with an old associate! / 64

Around the time I became Chairperson of the Department of Pharmaceutical Sciences, Professor Kumar had become Secretary to the then Vice Chancellor (SVC). Generally the Vice Chancellors would refer files to SVCs for their opinion. Professor Kumar being legal luminary, he vetted documents also. The campus was returning to normalcy (post Punjab troubles) and we were preparing to celebrate the golden jubilee (1944-94) of our department in December 1994. The department was planning to host the national conference of the Indian Pharmaceutical Congress (IPC) to commemorate the event. It was a mammoth event of organizing the resources and planning the logistics for almost 3000 delegates. Besides bringing academic calendar back to normal (by containing student unrest), organizing mini-conferences or workshops leading up to the mega event in December and holding University Oration which was not held for some times and most importantly planning the budget for the event and collection of resources were on my

agenda. There was a great expectation from the new Chairperson.

In the meantime I had personal set back soon after I became the Chairperson in January 1994. My revered father of 80 years passed away in Karnataka. We had to rush home for the last rites. On my return from home we formed the formal Organizing Committee for the IPC1994. There were many senior professors in the departments but the faculty decided that I should take the reins of the Organizing Secretary. I accepted the challenge and took the first opportunity to meet the Vice Chancellor to brief him about the event and other related academic matters of the department. He was gracious and kind enough to extend full support of the University for the Organization of the IPC1994 to commemorate the golden jubilee of the department. Being a man of management, the VC asked me to make milestones leading up to the event and assured of easy access to his office for any permissions and approvals

The lost world found: Reconnecting with an old associate! / 66

etc. He instructed his Personal Assistant (PA) on the matter. But for advancing some money to kick-start the preparations, he was very straight forward and said, 'Professor Kulkarni, I am confident of the capabilities but as a policy matter University cannot give any financial support as advance (Rs 50,000/-) but rest assured that every facility on the campus would be made available to you without any condition'. That was a great assurance which the University kept up till the end.

The department had a long history of manufacturing herbal (*Euphorbia prostata*) pile medicine and sold it at very nominal price of Rs 5 per course which included few capsules and an ointment tube. It was the legacy of the first head of the department Late Professor KN Gaiind who formulated and made it available to public. Interestingly the whole process was budgeted in the University accounts and a post of technical staff was provided to assist the process. The herb was seasonal

and collected by an expert and processed. The department would make about 100 capsules and some tubes and sell them on first come first bases. Once the season got over and the preparations exhausted the patients had to wait for the next season. Whatever the income generated from the sale would be deposited in the University and the same was made available for any petty expenses. A registry was maintained and audited annually. One of the senior teachers in the Pharmaceutics section was in charge of the whole process. This legacy was going on for nearly 30 years. Some patients even booked their doses in advance as there was no effective pile remedy available.

A few days after I settled down, one of my colleagues who was looking after the preparations of the pile medicine brought one representative of a pharma industry (who also happened to be his classmate) to negotiate the commercialization of the pile remedy so that mass production can be done by the company. The

The lost world found: Reconnecting with an old associate! / 68

idea was good but the amount offered was very meager and the offer didn't materialize. The idea of commercialization was working in my mind and soon another former student of the department who was holding a senior position in the Delhi-based pharma company came to meet me with his proprietor. They were interested in buying the pile medicine know-how for commercialization. Their offer was a win-win situation and my colleague was very happy. We formally moved the papers to the University for the Consideration. In the meanwhile many of my senior colleagues were unhappy and lodged a written complaint to the Vice Chancellor. One day I received a note from the office of the Vice Chancellor to sort out the issue in presence of SVC Professor Kumar. I organized a meeting of all senior colleagues (except the person who was in charge of the project) in Chairperson's office and I also invited Professor Kumar to hear their complaints. Every senior professor claimed that he had worked on the project at one time

or the other and would be eligible to get the (financial) benefit. As they say, **‘success has many fathers!’** They also said that the present Chairperson (ie; SKK) had nothing to do with the pile medicine production in other words I should not be getting any financial benefit. Professor Kumar listened to them patiently and with a smile turned to me and asked if I had anything to say. I said, ‘I have nothing to say but I wanted the committee to hear the views of the person who was in charge of the production for the last two decades’. I invited our colleague and Professor Kumar interacted with him. Our colleague made it very clear that none of the senior colleagues had anything to do with the production of the medicine and it was the efforts of the Chairperson (SKK) that made it possible to negotiate the deal. Professor Kumar concluded the meeting and everyone was about to leave my office, I intervened and requested Professor Kumar to dictate the minutes of the meeting in front of all of them. I made them to sign the minutes to confirm the decision.

The lost world found: Reconnecting with an old associate! / 70

That not only paved the way for us to sign an MoU (Memorandum of Understanding) with the company for transfer of technology for a handsome amount but it was the first of its kind of deal the University had struck in its long history. Two things happened subsequent to the signing of the MoU. Firstly, my professional and personal bondage with Professor Kumar (also our family bondage with Dr (Mrs) Pragya Kumar who was the CMO) was sealed and secondly as I understand University continues to receive 2% royalty of the profit made on the sale of the product from the company even today. No one has expected, including the distracters that a deal of this magnitude would ever take place. To make it clear, I didn't receive anything except the goodwill of the company!

We had a walking group of four professors who lived in the neighborhood on the campus. We were known for our punctuality and 'no nonsense' discussion during our walk. Invariably we used to see very briskly

walking Professor Kumar on the ground and he would join us in his last round. As we parted every day I used to see two stray dogs wagging tails following Professor Kumar up to his quarters. Out of curiosity one day I asked him about the mystery of stray dogs following him. He had a hearty laugh and said, “Professor Kulkarni, after the walk we eat egg omelet without the yellow portion which these two stray dogs are looking forward to!’

Professor Kumar had retired long back but he was one of the legal luminaries who regularly wrote commentaries on High Court or Supreme Court (SC) judgments particularly on constitutional matters. He would also give talks on such judgments on the campus. Once I heard him speak on one of the landmark SC judgments, ‘Minority institution (Hegde of Manipal vs State) vs the state of Karnataka’. After the talk I suggested him to use power point (using bullet points) presentation mode. He was excited to

The lost world found: Reconnecting with an old associate! / 72

learn the process and as I gather that his lectures are now using ppt-mode.

Recently I received a surprise call from Professor Kumar after almost 12 years. For both of us it was a great pleasure of reconnecting, 'the lost world found' as he put it! He also sent me one of his recent articles, 'Revisiting Gandhi in our contemporaneous world' which would appear in the book, 'Mahatma Gandhi Then and Now' to be published by the University of Mumbai. The article immediately got my attention on two counts, firstly, very recently I had written a brief on "Relevance of Mahatma" (in the context of managing the pandemic) and secondly, Professor Kumar had so eloquently drawn a corollary in his article between what happened in the life of revolutionary Sardar Prithvi Singh Azad under the influence of Gandhiji to surrender and the teacher-taught relationship between Gandhiji and Sardar Prithvi Singh in the contemporary system of education. He

wrote and I quote, ‘Gandhian principle of non-violence (*Ahinsa*) is not just an opposite of violence (*Hinsa*), but an all pervading, comprehensive, concept, inheriting the multiple core values of life’, unquote. The teacher in Gandhiji successfully taught those values to the revolutionary Prithvi Singh, citing the age old Upanishdic principle of lore, ‘one can attain enlightenment only through faith, understanding, and realization’, said his article.

In understanding the transformation of revolutionary Sardar Prithvi Singh on that critical night to surrender to armless non-violent fakir, Gandhi, I had invoked an analogy of what 15th Century Kannada saint and poet Purandar Dasa had stated in one of his verses, ‘until one is a gulama or dasa (servant) of the Guru (spiritual teacher), he cannot attain mukuthi (becoming one with the supreme God or attaining liberation from the cycle of life and death!)

The lost world found: Reconnecting with an old associate! / 74

In the backdrop of ‘teacher-taught’ relationship between Gandhiji and Sardar Prithvi Singh, Professor Kumar examines at length the relevance of contemporary system of education in India. While doing so, he refers to the speech of the Prime Minister at the Conclave organized by the MHRD in September 2020 on New Education Policy (NEP) where the PM made a case for moving away from ‘mark sheet’ and ‘pressure sheet’ centric approach to ‘self-assessment and peer assessment’ mode. The NEP focuses on ‘personal accomplishment and enlightenment’ of each and every individual contributing to the overall socio-economic reconstruction of the nation. NEP rejects the colonial idea of ‘exclusion’ by contrived process of ‘selection’ leading to high rate of rejections. The process enabled to create an elite class out of huge Indian masses. He quotes Gandhiji’s statement at the ‘Round Table Conference, 1931’, ‘The beautiful tree of education was cut down by you British. Therefore,

today, India is far more illiterate than it was 100 years ago', unquote.

In his thoughtfully analyzed and written article, Professor Kumar revisits Gandhiji or sees Gandhiji's principles and practices in 'Swatchhbharat abhiyan' to most recent '*atmanirbhar (self-reliant) Bharat*'. Reminds us of forgotten values for which India was known.

Really the lost world was found!!

7. Reflections on the Development of Pharmacology in India (From 1949-2020)

'Will it surprise you if I say that I am speaking from the same premises where I started my career way back in January 1949? It is almost 72 years since then, Ladies and Gentlemen that I continue to use the same office room for all these years' - PC Dandiya

I joined the Department of Pharmacology in January 1949 as a lecturer in the brand new Government Medical College, Sawai Man Singh Medical College, Jaipur (named after the Jaipur ruler). It was the first medical college in the state of Rajasthan (only the 15th in the independent India). Not many trained teachers in the subject were available in the country except the legendary Dr Rama Nath Chopra, who had training under Professor Walter E Dixon at Cambridge, England. He was inspired by the experimental approaches in pharmacology while working in

England. After the 2nd world war he was appointed to the Chair of (as the first Professor) Pharmacology at the School of Tropical Medicine in Calcutta. He (R.N. Chopra) unconsciously served to build the discipline of pharmacology from what was then taught as '*Materia Medica*'. He had a great faith in the healing properties of Indian medicinal plants (also known as indigenous drugs) and advocated for systematic studies of Indian medicinal plants. While in Calcutta (1921-41) several young researchers were trained under him to undertake systematic study of indigenous drugs. Dr B. Mukerjee who went on to become the first Director of Central Drug Research Institute (CDRI) in Lucknow was one amongst them. In many ways he could be compared to Oswald Schmiedeberg of Germany and John Jacob Abel of America who were responsible in spreading the discipline of experimental pharmacology in Europe and North America, respectively. Rightly so, Dr Ram Nath Chopra has been called the '**Father of Indian Pharmacology**'. After retirement as Director of School

Reflections on the Development of Pharmacology in India (From 1949-2020) / 78

of Tropical Medicine, Calcutta Dr R. N. Chopra settled in his home state of Jammu and Kashmir. He was however, asked to establish the Drug Research Laboratory in Srinagar and Jammu as its director.

In 1949 I never thought that one day I would train myself under Dr. R.N. Chopra in Srinagar. As things happened in 1952 the Government of Rajasthan sent me to receive training under him on the isolation of active principles from indigenous medicinal plants. Little did I know then that one day I would deliver Sir Ram Nath Chopra oration of the Indian Pharmacological Society in 1987.

In the following years from 1948 to 1960, several teachers and researchers working in the field of pharmacology received international fellowships and scholarship to go abroad and receive advanced training in the subject. Dr. R.B. Arora who was the Head of the Department at Jaipur was amongst the first few to go the Harvard University in the USA in 1953. Similarly, I

was fortunate enough to receive a Colombo Plan Fellowship to go to Canada and study pharmacology at the University Of Toronto Medical School under Dr H Cullumbine, a renowned pharmacologist who had served during the Second World War with the Allied forces in Germany. The University of Toronto was already known for its contributions of discovering insulin by Banting and Best (1921) and anesthetic cyclopropane, a precursor of Nitrous Oxide used as general anesthetic agent. After receiving doctorate in Pharmacology I returned to my parent department in Jaipur to embark on research journey in SMS Medical College. Having pharmacy background I was able to explore and excel both in my research career as pharmacologist and in my professional endeavors in pharmacy. It was a rewarding journey of over half a century.

Experimental pharmacology taking roots in medical curriculum: There was a time when *Materia Medica*

Reflections on the Development of Pharmacology in India (From 1949-2020) / 80

was taught to the medical students in the third year of medical course and it formed a part of the examination. The course covered physical identification of medicines, particularly herbal drugs and some powdered preparations etc. Slowly in the decades to follow from 1950 to 1970 or so the Experimental Pharmacology got developed in certain departments of pharmacology in the medical colleges. As a result facilities for demonstrating drug effects on isolated heart, intestinal smooth muscle preparations were created. This also in many ways paved way for basic research in pharmacology to take roots particularly study of active principles of

Indigenous drugs and to study the mechanisms of actions of synthetic drugs and creation of animal house facilities in medical colleges. Many medical colleges namely, AIIMS, New Delhi

(Dr RB Arora), SMS Medical College Jaipur (Dr VN Sharma and Dr PC Dandiya), K.G. Medical College

Lucknow (Dr KP Bhargava), Seth G.S. Medical College (Dr UK Seth), Bombay, Madras Medical College (Dr Lalitha Kameshwaran) Madras, JIPMER Pondyicherry (Dr MN Ghosh), to name a few became active centres of pharmacology research in the country. Indian Council of Medical Research and CSIR gave liberal support to basic research mainly plant-based studies. That was the beginning of extramural grants for state medical colleges. The pharmacology subject was taught for one-and-a-half years and experimental pharmacology formed a significant part of the examination system in the second MBBS examination.

Around this time (1932 to 1980) only handful of pharmacy colleges and University departments existed in country. However, none of them had qualified teachers to teach the subject of pharmacology. Part-time teachers or some practicing medical doctors taught the subject in the final year of the pharmacy course. The situation was not different even in the veterinary

Reflections on the Development of Pharmacology in India (From 1949-2020) / 82

institutes. It was only after the 1980s the initiation of both experimental pharmacology and basic research in the subject got its due starting from Panjab University (Dr SK Kulkarni) Chandigarh. To look back (in last 40 years), if there is any basic and to certain extent advanced research in pharmacology if at all, done or reported from India, is from the divisions of pharmacology of pharmaceutical sciences institutions in the country. Medical Colleges have adopted a soft option of clinical pharmacology, instead.

Crusade for establishing ‘Indian Pharmacological Society’: In the beginning, the Association of Physiologists and Pharmacologists of India (APPI) was the main scientific forum for pharmacologists to present their research findings at the annual conferences. APPI was affiliated to International Union of Physiological Sciences (IUPS). However, APPI was dominated by physiologists of international repute like Dr BK Anand, Dr AS Pental, and many such. The

representation of pharmacologists was very minimal. Even the **International Union of Pharmacology**, now known as the **International Union of Basic and Clinical Pharmacology (IUPHAR)** had recognized APPI as the Indian representation. As the discipline of pharmacology

grew in the 1960s, a need was felt to have an independent society for the subject. Some of the senior professors of pharmacology like Dr Govind Achari, Dr KP Bhargava, Dr PC Dandiya, Dr

UK Seth and others represented to IUPHAR headquarters in Sweden to recognize Indian Pharmacological Society as an independent association away from APPI. Dr. Borje Uvnas of the Karolinska Institute in Sweden was the President of IUPHAR at that time. Dr B. Uvnas was also the Chairperson of the Nobel Prize Committee for Physiology and Medicine award. He was invited to the First meeting of the Indian Pharmacological Society (IPS) held in Patna in 1969

Reflections on the Development of Pharmacology in India (From 1949-2020) / 84

under the Presidentship of Dr Govind Achari. Dr. Borje Uvnas was impressed with enthusiasm of the pharmacologists and the scientific presentations. During the next IUPHAR meeting held at San Francisco USA IPS received the recognition as the official Indian representation to the international organization, ie; IUPHAR. Many senior professors from India including myself (PCD), and Dr JS Bapna attended the meet. It was the beginning of a new era for the society. Dr B. Uvnas and his wife Ingrid became almost regular invitees to the IPS annual meet. He was the Chief Guest at the 1993 IPS conference held at Agricultural University, Hissar. They continued to be the friends of India particularly me (PCD) and Dr Bapna and made regular visits to Jaipur. The society instituted an award in the name Dr B. Uvnas called “Uvnas Prize in neuroscience”. Dr Uvnas subsequently delivered the prestigious Professor Prem Chand Dandiya Trust Oration (initiated by my students and former colleagues) at New Delhi and spoke about the

intricacies in the selection of Nobel laureates. At one time he (Dr Uvnas) expressed his desire to make substantial donations to the society but was not sure of legitimate use with the passage of time (which appeared to be a wise decision). As a kind gesture he gave replica of the Nobel Peace Prize medallion to me (PCD) and to Dr JS Bapna. The society should be indebted to Dr B Uvnas!

Indian journal of Pharmacology (IJP): Soon after the society was formed, it was decided to publish Indian Journal of Pharmacology as its official organ. Dr KP Bhargava of Lucknow became the first Chief Editor of the journal. He was followed by Dr UK Seth and then I took over the Chief editorship. The journal faced couple of problems mainly resources and quality articles. It was receiving only those articles which were either rejected by the foreign journals or

less important publication material. It is almost five decades since the beginning of IJP publication the

Reflections on the Development of Pharmacology in India (From 1949-2020) / 86

issues (not the financial as I understand) have not only remained same but the quality has drastically fallen. It indirectly reflects on the status on research carried out in the country.

The developments in pharmacological sciences have come a long way ever since the discovery of life saving drugs like antibiotics (penicillin in 1945), drugs for cardiovascular diseases, mental disorders, endocrine disorders, contraceptives, and cancer treatments. When I started teaching the subjects in 1949 only a few therapeutic class of drugs were known. There has been revolutionary breakthroughs in basic sciences and molecular biology in the last half century. As a consequence, we have several new therapeutic class of drugs; from next generation of antibiotics to altogether new categories of drugs, statins, ACEIs, H2-blockers, antioxidants, anti-migraine drugs, SSRIs, newer steroids, specific anticancer drugs, antiviral agents and the list is unending. We had not heard about

'blockbuster' drugs until atorvastatin, a cholesterol lowering drug which alone had an annual sale of more than \$12 billion in the USA which was considered to be more than the total turnover of Indian Pharam industry (about \$ 8 bn) at the given time. Fluoxetine (Prozac) was another blockbuster drug used in mental depression. It is often attributed that longevity of man is due to the availability of modern drugs besides other factors. Newer challengers are posed as newer diseases emerging including the current Covid pandemic.

Concluding remarks: Reflecting on my career as a pharmacologist, I had the dual advantages of having my basic degrees in pharmacy from India's Heritage University, the Banaras Hindu University at a time when Sir Dr Sarvepalli Radhakrishnan, philosopher, academic, and statesman was the Vice Chancellor of the University and then starting my academic career in medical education. It was opportune time for one to excel in research as well in professional endeavor. I

Reflections on the Development of Pharmacology in India (From 1949-2020) / 88

was able to achieve both to a great extent. After returning from abroad in 1957 I was able to establish a dedicated school of Neuro-psychopharmacology to carryout research on psychopharmacological agents. A large number of dedicated students came from different parts of the country to obtain advanced degrees in pharmacology. They immensely contributed to the science of psychopharmacology. My involvement with pharmacological society (as General

Secretary, Chief Editor and President) was rewarding. At the peak of my career I was invited to write a review on the status of pharmacology in India, **‘Pharmacological Research in India’** which appeared in the Annual Reviews of Pharmacology, Academic Press New York in 1974. It

was co-authored by one of my colleagues, Dr JS Bapna. Till date it remains as a status paper on the subject. Reflecting on India’s contributions to new drug discovery, it is dismal. As early as 1952 our first Prime

Minister Jawaharlal Nehru inaugurated the establishment of the Central Drug Research Institute (CDRI), Lucknow dedicated facility for discovering drugs from indigenous and synthetic sources. The outcomes are not rewarding even after 70 years. We are far behind rest of the world in innovation science particularly for discovering ‘Make-in-India’ drug molecule. Chinese were successful in isolating Artemisinin from the plant *Artemisia qinghao* (*Artemisia annua* or sweet wormwood) for the treatment of malaria. The lady pharmacist who isolated the compound, Tu You-You, received the Nobel Prize in 2015. On the contrary, it is a heartening fact that Indian Pharmaceutical industry has done remarkably well to become the ‘Pharmacy of the world’ in terms of supplying generic medicines to the world. There is wealth of knowledge and expertise in the country, I conclude on an optimistic note that the day is not too far away for the discovery of new molecules from Indian science.

Reflections on the Development of Pharmacology
in India (From 1949-2020) / 90

Based on Professor PC Dandiya's keynote address at
IPS Webinar 2020

8. A chat on Pharmacy education and research ecosystem*

Pharmacy education in India lacks the direction not just in terms of curriculum but also in terms of advanced research facilities, well equipped laboratories and trained faculty. There has been a paucity of qualified and trained teachers to conduct outcome oriented research in pharmacy. Historically the curriculum is focused on manufacturing of drugs and less on innovation science and drug discovery; according to Professor S. K. Kulkarni, who was recently described by the Stanford University USA report as the top (Rank 1) Pharmacologist of India based on the SCOPUS data assessment of science publications, citation and H-index etc of nearly 100,000 scientists of the world. He is among the top 2% of scientists with global ranking of 132 (Ref Professor John PA Ioannidis, PLOS Biology, 2020).

A chat on Pharmacy education and research ecosystem* / 92

The existing research centres have not been able to discover a drug for India's specific medical needs like dengue, malaria and multi-drug resistant (MDR) tuberculosis. Non-existence of a research culture and drug discovery being cost and time-intensive process, our Universities and research laboratories are not able to find any new drug for diseases specific to India. Moreover, it takes about 10 years of rigorous study and investment of over a billion dollars to find a new drug. Innovation ecosystem is absent even in major Universities where pharmacy departments exist. As of today, there are over 3000 pharmacy colleges. Extramural resources and proper infrastructure to carry out high end research are lacking in majority of the colleges, according to Professor Kulkarni.

The Government on its own initiative started many NIPERs (National Institution of Pharmaceutical Education and Research) across the country with a mandate to produce qualified manpower and create

research environment in the country. Unfortunately that has not happened and as a matter of fact many of them are yet to take-off. Even the first institute (NIPER) established some two decades ago does not have fulltime director for many years now, he noted.

On what needs to be done to create a research ecosystem, Professor Kulkarni felt that only institutions with suitable facilities and faculty expertise must be funded with a mission so that they are able to enhance quality of research with return on investment (RoI). In order to achieve RoI one need to focus on quality and not on quantity.

Indian Pharma industry has done remarkably well and recognized as Pharmacy of the World as it supplies 40-60% of the global requirements of generic drugs to the regulated markets of the US and Europe. Most of the multinational companies which ventured to drug discovery mode in 2004-05 have now given up the idea

A chat on Pharmacy education and research ecosystem* / 94

as the investment and its return do not commensurate and are not immediate as against production of branded and generic drugs. The clinical research and clinical trial industry which took off in 2004-05 has slowed down for obvious reasons of poor ethical and documentation practices.

To overcome the present pandemic, entire world is trying to find effective remedies and vaccines for Covid19. Indian Pharma and vaccine production facilities are considered to be major suppliers of vaccines because of the production scale and capacity in the country. Some of the vaccines developed abroad are undergoing clinical trials in India. The government is very optimistic about the capabilities of the Indian Pharma industry, at least three indigenous vaccines will emerge' said Professor Kulkarni.

*Interview published in Pharmabiz (Dec 2020) after the Stanford University USA report (PLOS Biology 2020) describing Professor SK Kulkarni as the top ranking (Rank 1) pharmacologist of India with a Global ranking of 132.

9. Endangered species and the science of learning

Many of us are scared of frogs which are generally seen in the rainy season in our country. The slimy creature covered with layers of mucus make them uneasy to hold. The mucus helps the skin retain moisture, so that they breathe and stay hydrated. Frogs are amphibians, they have jumping abilities, make croaking sounds, bulging eyes and slimy skin. The way frogs hop and make sound, sometimes scare the kids and make it difficult to catch. Being amphibian *frogs live both in water and on the land*, hiding and feeding in surrounding vegetation. Frogs breed or reproduce in the surrounding water. When in the captivity, frogs are kept in the froggery with continuous flow of water. They are found all over the world and with more than 6,000 species. *Rana tigrina* (*Hoplobatrachus tigerinus*) is the most common Indian frog. It is mostly

solitary and nocturnal in nature. They live in holes and bushes near water sources.

In the 1960s and 70s rectus muscle preparation of frog was the most common tissue preparation used to demonstrate the contractile response of acetylcholine (ACh) on skeletal muscle. Rectus abdominis is a voluntary skeletal muscle and very sturdy preparation. The preparation is used to demonstrate the observations like muscle contractions. The advantage was that the tissue preparation worked for long period of time without needing any oxygen to survive unlike intestinal smooth muscle preparations. This muscle preparation was used to study the basic principle of drug actions namely, the dose or concentration response (DRC or CRC) curves/relationships. The DRC or CRC is the fundamental principle of drug administration. By nature the effect of any drug/medicine follows the principle of dose-response relationship. In other words, with increasing dose, there will be a proportional

Endangered species and the science of learning / 98

increase in the biological response. Precisely, the objective of the demonstration used to show how dose or concentration affected the physiological response of contraction ie; the dose-response curve (DRC) or the dose-response relationship. The rectus abdominis muscle of the frog is a slow contracting preparation ie; acetylcholine (ACh), a neurotransmitter in the parasympathetic (cholinergic) nervous system induces contractile response very slowly and as the effect wanes the muscle returns back to its initial position. ACh has contractile response both on smooth muscle like intestine and on skeletal muscle like the rectus abdominis. ACh effect on smooth muscle is called muscarinic (mimicked by the alkaloid muscarine, obtained from the poisonous mushroom *Amanita muscaria*). Whereas it's (ACh) contractile effect on skeletal muscle of rectus abdominis is called nicotinic (mimicked by the alkaloid nicotine obtained from tobacco plant *Nicotiana tabacum*) in nature. Such basic principles of drug action could be demonstrated or

studied using frog rectus preparation. Students used to be excited to get DRC or CRC responses to confirm the phenomenon.

There was an approved vender who supplied frogs during the rainy seasons. We had a frogger and we would store them and breed during the season. In the rainy season each frog used to cost Rs 3 to 5 only. From one frog two rectus preparations could be prepared, in other words two students can mount the preparation. Till the end of the semester ie; from July to December all frog related experiments were generally carried out by the students.

Besides the study of contractile response of ACh on skeletal muscle preparations, at least 6 to 7 different types of experiments were carried out using frog such as effect of drugs on frog heart, local anaesthetic effects (foot withdrawal reflex of frog), ciliary movements in buccal cavity, and studying the phenomenon of drug potentiating and antagonism.

Endangered species and the science of learning / 100

Students would perform these experiments on their own to appreciate complex pharmacological principles using frogs.

By the mid of 1990s some species frogs were included in the list of '*critically endangered*' creatures and suddenly all the experiments on frogs were stopped. That was the time also when more and more restrictions were imposed on the use of laboratory animals (rats, mice and guinea pigs etc) for research. All institutions and research laboratories constituted animal ethics committees to establish humane use of experimental animals. The principles of triple-R (*3Rs*) (Replacement, Reduction and Refinement) were put in to place providing new a framework for judicious use of animals in research. One may add 'Reuse' to 3R concept wherever possible. The animal breeding and storage facilities needed to be approved by the competent authorities. The use of bigger animals like dogs and cats for research has been totally banned. This

has not only slowed down but also critically affected postgraduate and doctoral research in biology more so in Pharmacology and drug discovery research.

Kulkarni, SK: Handbook of experimental pharmacology, Vallabh prakashn, New Delhi (2012).

10. Mango talk

Covid or no Covid, it's a mango season (April-May). On my morning walk I heard two other walkers talking about mangoes that caught my attention. One was telling, 'yesterday I got two boxes of mangoes'. The other asked, 'which variety?' His friend replied, 'of course, Ratnagiri aam!' 'Nice!' said the friend and asked him, 'did you get for good price?' 'Yes' said the friend, 'the prices have come down, but the problem is, my wife is diabetic and I can't eat all of them by myself!' 'I could have taken one box from you but I have stock of Devgad variety at home', said the other. That's when I asked them, 'what is the difference between and Devgad and Ratnagiri varieties?'

One of them said, 'frankly, all good mangoes have the same 'gotra', some call them Ratnagiri and others Devgad!'

But the experts say the skin colour and its thickness, and the size make the difference; Ratnagiri variety has shades of saffron colour, thin skin and small in size whereas Devgad variety has yellowish-orange colour, thick skin and relatively big in size. Both have ‘impeccable aroma’ that can be recognized even from a distance.

Mangoes are our family weakness, I may say, we are a mango family, not that we grow them but relish them utmost. Covid-curfew or lockdowns have not dented our mango consumption. During the mango season we would have mango pulp (sikarni) everyday as part of lunch menu. Our late father often would tell that you should eat or enjoy so much of mangoes in the season that your skin colour turns golden! In those days Ratnagiri alphanso were not available in our district (Bijapur). We used to eat the local variety. Those were different days; the regular mango seller (lady) would come to our home carrying basket full of naturally

ripped mangos everyday in the morning during the season and supply the requisite quantity. One of us would help our mother or sister to squeeze the mangoes to remove the pulp. Part of the summer we used to spend in Dharwar with maternal grandparents and relish different variety of mangoes there. Our maternal uncle has developed mango orchard and grows variety of hapus mangoes including Dharwar variety.

When I moved to north India, first for my studies and later with family to work; we learnt that the mango season starts much late, almost after it ends in the south and also the variety of mangoes in the north are different. Generally the mango season starts in north in June or so where as in Karnataka people stop eating mangoes once the monsoons set in. Dasherri, Langra and Chausa variety are popular in the north. Most of these varieties are grown in Uttar Pradesh and adjoining belt. Once on the campus in a specious bungalow, we realized the importance of having

backyard and our own garden. The founding fathers of the University were visionaries not only in establishing various teaching departments, some unique to the University system in India but also created spacious residential quarters for the faculty and the staff. Our bungalow (T1/15) had two mango trees (one yielding Dasherri and the other Langra), litchi tree, guava tree, two sitaphal trees and lemon tree. Besides these, at the corner of the front compound wall we had big bael tree. All of them fruit yielding. We had not seen litchi tree before nor had relished them, a rare delicacy. The beauty was that each tree would bear fruits at different time of the year so that not only one could manage but also enjoy them according to the season. Initially we had a University gardener (mali) who would visit once a week but soon realised that we needed a full time gardener to maintain these plants and the small kitchen garden plus huge flower bed. We were lucky to get one dedicated gardener who would visit every day and took care of the plants, kitchen garden and arranged the

flowers according to season. It was sheer pleasure. My wife would spend 2-3 hours watering the plants in the evening.

Of the two mango trees, Dasherri would bear fruits every year whereas the other, Langra would bear fruits alternate years. Even then some fruits would come of Langra annually. In the spring when flowering start appearing, mali would put manure and start preparing for the upcoming season. Both the trees would yield around 600 to 800 fruits. Our mali was an expert as to when to pluck them and how to naturally ripe them. We had a big room in servant quarters and put them on dry grass or put them in boxes to ripe. It was an art to stagger their ripening so that they didn't spoil. At the beginning of the season we would share with our neighbours and they would reciprocate their mango yields with us.

Post retirement when we moved to Mumbai, we started enjoying Alphonso mangoes. It was amazing to see the export business of Alphonso variety in Santacruz mango market. They would not talk to customers as they would be busy always loading the boxes to cargo. The prices were always skyrocketing. Now in Belgaum, we get good variety of both Ratnagiri and Devgad varieties of mangoes, in the beginning of the season they are expensive but as season peaks up they are very affordable. They are called Alphonso variety, named after Afonso de Albuquerque a Portuguese general who helped to establish colonies in India. The Portuguese introduced grafting on mango trees to produce ‘Alphonso’ variety. This variety is mainly grown in West coast, Ratnagiri and Devgad region. The Ratnagiri variety mango growers say, ‘Buy residue free Ratnagiri hapus *mango* directly from the farms of Ratnagiri, we put love in every box of Ratnagiri *alphonso mangoes*; your satisfaction is our focus’.

Mango talk / 108

Really true, once you relish the Alphonso mangoes, whether Ratnagiri or Devgad you are bound to say ‘they are the King of mangoes!’

11. Liberal thought!

Our first visit to Bay Area was in early 2012 where our son Setu (Anup) and his wife Amarantha were working in Palo Alto, California. Palo Alto is headquarters of many IT companies and of course, the Stanford University campus. Subsequently we have been visiting the area more or less annually. The cruel pandemic prevented our planned visit in 2020! Besides children and grand children, Stanford campus remains an attraction for repeat visits, and of course the Golden gate of San Francisco. Many visitors to Bay area visit the headquarters of Facebook and get photographed in front of the iconic ‘thumbs up’ billboard of the company. Our Prime Minister had an emotional visit to Facebook headquarters couple of years ago. Somehow, we are yet to visit the ‘thumbs up’ billboard!

Like many, in the beginning I was also active on the Facebook and posted regularly pictures, greetings and

brief messages for the first few years. For some reasons I am not that active on Facebook anymore. One of my elderly (80 years young) walking friends and co-residents in the apartment complex has suddenly become very active and started posting his daily greetings, captioned pictures and stories on Facebook. Not only that, when we meet in the morning, first thing he enquires, ‘whether I have read his latest postings on Facebook?’

The CEO Mark Zuckerberg and the COO Sheryl Sandberg (author of Lean in) of Facebook are popular in India. Suddenly, Facebook and other social media platforms are under cloud and even litigation in many countries. There is a pandemic of fake news and hate on social media. Hate speech, disinformation and rumors have caused acts of violence and grave consequences in India. There are huge amount of edited images, manipulated videos, fake text messages circulated through social media platforms and

WhatsApp messaging. In a country like India such misinformed news play havoc on both emotional and religious sentiments. Recently the Ministry of Laws and Justice of Govt of India had summoned the head of Facebook operation in India for explanations. Facebook and other platforms like Twitter are now moderating such contents and even removing the posts that promote violence, manipulated photographs and videos etc. WhatsApp reported that it was deleting two million accounts per month to prevent spread of fake news and misinformation. The current pandemic and home restrictions have added fuel to the idle minds. Two decades of technology revolution is impacting adversely businesses, political systems, personal and family lives.

There is a new breed called 'liberals' who keep questioning the regulations and the establishment(s) in the name of freedom of expression and democracy. Freedom comes with responsibility, said Eleanor

Roosevelt, US diplomat and activist and also the First Lady of President Franklin D. Roosevelt. Responsibility and freedom; the two come together and go together; one can't have only the freedom. Whenever the government exercises restricted use of internet services in very volatile areas to prevent spread of misinformation and violence, the liberals argue for freedom of expression and the democratic rights of the citizens. The liberal thought(s) (century old political doctrine) has common ideology of believing in equality, individual liberty, individual rights etc, and the idea of limited constitutional government (believe government is necessary to protect individuals being harmed by others but argue that government itself can be a threat to liberty; government at best 'a necessary evil').

The launch of social media platforms in recent times has made each one of us content creators and publisher of our creation. When the quality of the published

content is neither regulated nor controlled, especially in our country it will erupt social tensions and unrest. Conservative thinkers believe that lasting and beneficial social change must proceed organically, through gradual shifts in public attitudes, values, customs, and institutions. Any sudden shift of gears without the associated duty and responsibility, free (liberal) thought and freedom (democracy) will have far reaching adverse consequences.

Post script

According to a very recent media report the bench headed by the Supreme Court CJI and two other judges remarked, ‘What is evidential value of WhatsApp messages these days? Anything can be created and deleted on social media these days. We don’t attach any value to the WhatsApp messages’.

12. Can India legalize medicinal use of Marijuana?

The use of Cannabis in various forms (*charas, ganja, bhang*) is known to us from time immemorial. The *Atharveda* (science of charm) the revered Hindu text described Cannabis as ‘sacred grass’ one of the five sacred plants ritually offered to Lord Shiva. The so called ‘soma rasa’, elixir of life or ‘amrita’ believed to be a plant extract or juice but not sure whether it contained Cannabis; purified all sins, provided enlightenment and eradicated darkness (according to *Rigveda*, veda of knowledge). The ancient texts do not mention Cannabis as addicting or psychoactive, people consumed it for psychedelic properties for centuries in India. For long it was known that the consumption of Cannabis reduces anxiety, stimulates appetite, and produces sleep.

Cannabis is by far the **most widely cultivated, trafficked and abused** illicit drug in the world. The Cannabis or marijuana plant contains more than 100 different chemicals called cannabinoids. Each one has a different effect on the body. **Delta 9 tetrahydrocannabinol (THC)** is the major psychoactive constituent in Cannabis. Delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD) are the main chemicals used in medicine. THC also produced a feeling of "high" when it is smoked or consumed orally in different forms.

Different forms of Cannabis include: '**Charas**' is the separated **resin extracted** from the Cannabis plant. '**Ganja**' as the **flowering or fruiting tops of the Cannabis plant** but it does not include the seeds and leaves. The concentrated preparation and resin are known as *hashish* oil or liquid *hashish*. The Narcotic Drugs and Psychotropic Substances Act, 1985 (which replaced the earlier Dangerous Drugs Act 1930),

Can India legalize medicinal use of Marijuana? / 116

commonly referred to as the *NDPS Act*, prohibits a person from the production, manufacturing, cultivation, or possession, sale, purchasing, transport, storage, and/or consumption of any narcotic drug or psychotropic substance. Further, NDPS Act defines **any mixture with or without any neutral material, of any of the two forms of Cannabis, *charas* and *ganja*, or any drink prepared** from it as illegal.

For many years, Cannabis and Cannabis-related substances have been included in the schedules of the Single Convention on Narcotic Drugs of 1961. The Single Convention on Narcotic Drugs of 1961 is an international treaty to prohibit production and supply of specific narcotic drugs and of drugs with similar effects except under license for specific purposes, such as medical treatment and research as amended by the 1972 Protocol (Schedule I and IV: Cannabis and Cannabis resin; Schedule I: extracts and tinctures of Cannabis), as well as in the Schedules of the

Convention on Psychotropic Substances of 1971 (Schedule I: tetrahydrocannabinol (six isomers of delta-9- tetrahydrocannabinol); Schedule II: dronabinol and its stereoisomers (delta-9-tetrahydrocannabinol). The inclusion in a specific schedule determines the control measures the States and parties are required to apply to the respective substances.

The modern research on Cannabis and its effects on brain functions has revealed plethora of information from specific CB1 and CB2 receptors for Cannabis actions, endocannabinoids (anandamide) to its several therapeutic indications. Medical uses of Cannabis or medical marijuana are many. It is used in chronic pain, nausea and vomiting due cancer chemotherapy, spasticity (tight or stiff muscles) due to multiple sclerosis, HIV/AIDS, Crohan's disease, glaucoma, appetite loss and also indicated in mental health for conditions like Alzheimer's, schizophrenia, epilepsy to post traumatic stress disorder (PTSD). The USFDA

Can India legalize medicinal use of Marijuana? / 118

(regulator) has approved CBD for the treatment of two rare and severe forms of epilepsy, Dravet syndrome and Lennox-Gastaut syndrome.

In the United States of America, the use of Cannabis for medical purposes (medical Cannabis) is legal in 35 states; four out of five permanently inhabited US territories and District of Columbia, as of November 2020. Thirteen other states have more restrictive laws limiting THC content, for the purpose of allowing access to products that are rich in cannabidiol (CBD), a non-psychoactive component of Cannabis. There is significant variation in medical Cannabis laws from state to state, including how it is produced and distributed, how it can be consumed, and what medical conditions it can be used for. California was the first state to legalize medical Cannabis way back in 1996. Since then several states followed it with successful ballot initiative.

Recognizing the increasing medicinal and therapeutic potentials and use, the World Health Organization (WHO) had recently recommended to UN Commission on Narcotic Drugs (CND) to reclassify Cannabis and remove it from Schedule IV of the 1961 Convention where it was listed alongside of narcotic drugs like heroin. CND (a 53 member body) has voted to remove Cannabis and Cannabis resin from Schedule IV of the 1961 Single Convention on Narcotic Drugs. It came after decades after they were first placed on the list. India was one of the 27 Member States voted (Dec 2020) in favor. India was part of the voting majority, along with the US and most European countries. On expected lines, China, Pakistan and Russia voted against, and Ukraine abstained. Now that it has been categorized under Schedule 1 list and would be considered as "least dangerous" substance(s).

The UN report said the CND will open the door for recognizing the medicinal and therapeutic potential of

Can India legalize medicinal use of Marijuana? / 120

the commonly-used but illegal Cannabis. Notably, Cannabis or marijuana is a banned drug under the NDPS Act, 1985, in India. Its production, manufacturer, possession to a certain limit, and sale is a punishable offence. Further, possession of Cannabis or any mixture with or without any neutral material, of any of the two forms of cannabis namely *charas* and *ganja* or any drink prepared from it is considered illegal under the NDPS Act 1985. In our country the **Narcotics Control Bureau (NCB)** is vested with the **power to charge individuals** in cases related to the **illegal use and supply of narcotics including Cannabis and related substances**. The **recreational use of Cannabis is banned** in India. While CBD oil could be manufactured and used legally with a license under the **Drugs and Cosmetics Act, 1940**. But it is not very common.

As far voting in favor of the UN resolution, India is party to CND reclassification. The UN resolution

would come in to action once the government passes an amendment in its NDPS Act 1985. There is a need to educate all concerned, the medical needy (patient and the condition for which it is absolutely needed), the prescriber (doctor) and the dispenser about the gravity of miss use of medical Cannabis. As such the Cannabis is socially used in festivals like holi in many parts of India. There may be arguments comparing alcohol use being permitted, there are no studies or clinical data on the Cannabis abuse and its management in our country. Sale of alcohol is a high revenue earner of any government but that is not good enough reason to include or not to include a drug in the list of NDPS Act. More churning is needed before the Govt allows medical Cannabis in our country. There are strict laws to regulate sale of drugs but equally enough violators in the society. Educating all concerned is the bottom line.

13. Blockbuster drug to cultural phenomenon

As undergraduate students of pharmacy during the 1960s, we were not taught about antianxiety drugs as they didn't exist then. We were told about CNS depressants as major and minor tranquillizers. Chlorpromazine (discovered in 1952) was the class representative of major tranquillizer and meprobamate (carbamates) was an example of minor tranquillizer. By the time I completed my doctoral work in early 1970s, a new chemical class of CNS active drugs called benzodiazepines had come to the fore. Chlordiazepoxide was the first benzodiazepine to be synthesized by Leo Stenbach in 1957 at Hoffmann-La Roche in Switzerland. It was a serendipity (chance observation) discovery as first of its kind anxiolytic (anti-anxiety) to be introduced in the name of Librium^R in 1960. It showed wide margin of safety between

sedative action and anti-anxiety properties. Three years later in 1963 an even more potent (2.5 times) benzodiazepine, diazepam (Valium^R) was discovered by Stenbach and soon to become a blockbuster drug. Diazepam showed a greater dissociation between its sedative and anti-anxiety properties. Not only that, it exhibited four important properties namely, anti-anxiety, sedative, muscle relaxant and antiepileptic properties. Muscle relaxant property was complimentary in its anti-anxiety and antiepileptic actions. By 1978 it became one of the most frequently prescribed medications in the world and in 1979 it was cited in the Guinness Book of World records as 2.3 billion tablets of diazepam were sold in the United States of America alone! After its patent expired in 1985, nearly 500 brands of diazepam are available in the global market. Diazepam caught the imagination of medicinal chemists and pharmacologists that as many as 2000 different benzodiazepine congeners have been synthesized and tested for their efficacy; and nearly 20

of them are used in different parts of the world for variety of disorders ranging from anxiety, panic attacks, insomnia, muscle spasms, sedation, status epilepticus, opiate and alcohol withdrawal syndrome and tardive dyskinesia. They are very safe drugs and no over dose-induced (up to 800 mg dose) death have been reported so far. Diazepam has long duration of action (half-life more than 24 hr) and its congener triazolam has ultra-short (half-life 4 hr) duration of action, respectively.

In the beginning for almost first 15 years we did not know how benzodiazepine produced their biological actions. In the course of last 60 years or so our understandings of the neurotransmission and receptor biology, their mechanism of actions have been fully explored. We now know for sure how benzodiazepines produce anti-anxiety, muscle relaxant, sedative and anti-seizure effects.

Benzodiazepines are known to be positive allosteric modulators of the GABA_A type receptors. The GABA_A receptors are ligand-gated chloride-selective ion channels that are activated by GABA, the major inhibitory neurotransmitter in the brain. Binding of benzodiazepines to this receptor complex promotes the binding of GABA, which in turn increases the total conduction of chloride ions across the neuronal cell membrane. This increased chloride ion influx hyperpolarizes the neuron's membrane potential. As a result, the difference between resting potential and threshold potential is increased and firing (excitation) is less likely. As a result, the arousal of the cortical and limbic systems in the central nervous system is reduced. In simple terms benzodiazepines increase the frequency of Cl⁻-channel opening leading to hyper polarization of the neuronal membrane. This is where they differ from barbiturates which keep the Cl⁻ - channel open for a long period of time leading CNS depression.

The GABA receptor pharmacology has been a fascinating development in neuroscience. It has unraveled our understandings of the brain functions as well as associated disease processes. GABA_A receptor is a heteromer composed of five subunits, the most common ones being 2 α , 2 β , and one γ subunits ($\alpha 2\beta 2\gamma$). For each subunit, many subtypes exist ($\alpha 1-6$, $\beta 1-3$, and $\gamma 1-3$). GABA_A receptors containing the $\alpha 1$ subunit mediate the sedative, the anterograde amnesic (loss of immediate memory), and partly the anti-seizure effects of diazepam. GABA_A receptors containing $\alpha 2$ mediate the anxiolytic actions and to a large extent the myorelaxant effects. GABA_A receptors containing $\alpha 3$ and $\alpha 5$ also contribute to benzodiazepines myorelaxant actions, whereas GABA_A receptors comprising the $\alpha 5$ subunit were shown to modulate the temporal and spatial memory effects of benzodiazepines. Diazepam antagonist, flumazenil competitively binds GABA_A receptors and blocks its actions.

GABA_A receptors are widely distributed in the central nervous system. Diazepam acted on GABA_A receptor located in brain areas such as limbic system, thalamus and hypothalamus for its anti-anxiety effects. It also increases inhibitory processes in the cerebral cortex. Electro-physiologically, the inhibition of polysynaptic pathways in the spinal cord contributed to the muscle relaxant properties of diazepam. The anticonvulsant properties of diazepam may be in part or entirely due to binding to voltage-dependent sodium channels rather than benzodiazepine receptors. Sustained repetitive firing seems to be limited by benzodiazepines. Thus, it slows the recovery of sodium channels from inactivation.

Cultural phenomenon: The last 60 years (1960-2021) of benzodiazepine use has left extreme influences on the society. Firstly, diazepam having quick onset of action, low toxicity, and high potency proved it to be an efficacious drug, and also a very widely or

overprescribed drug for managing anxiety, insomnia and panic disorders. Perhaps this notion that it is safe prompted it to become a pop-culture (abused) icon. The possibility of its addicting property was overlooked. Patients were prescribed greater doses for longer duration. By 1990s, diazepam and its long acting congeners became addicting, even chronic use in low-dose administration to treat anxiety, emotions and panic reactions. The misuse and abuse of the drug became a cultural phenomenon. There was a time when many irrational combinations of diazepam with other therapeutic agents were available. Individuals already abusing other illicit drugs like opiates and alcohol found easy access to diazepam and other benzodiazepines. The Controlled Substances Act in the USA and European countries put restrictions on the prescription of benzodiazepines. The widely prescribed short acting triazolam was banned in European countries. Benzodiazepines are labeled as high

potentials for abuse (especially through intravenous routes) drugs.

In 1994, the World Health Organization expert committee on drug dependence considered flunitrazepam abuse as a substantial threat to public health. Flunitrazepam was used as a “date rape” drug and strict regulatory restrictions were imposed on the sale of this drug. Although the number of prescriptions for diazepam has drastically come down, it still remains as a class representative of benzodiazepines and continues to be on the WHO list of essential medicines. In its 60 years of therapeutic journey for managing anxiety, panic disorders, seizures, among other illnesses, diazepam has revolutionized treatments of these conditions and unequivocally has earned the status as a classic in chemical neuroscience. The benzodiazepine story continues to evolve beyond our imagination as the global anxiety disorder (pandemic

Blockbuster drug to cultural phenomenon / 130

and associated depression) treatment market is expected to reach USD 20 billion in the coming years.

14. Pandemic and *Parle-G* biscuits

We were served with a hot cup of tea along with economy package (Rs 2) of Parle-G biscuits at the morning tea break in the canteen of Bombay College of Pharmacy. The crunchy 2-3 biscuits were relishing with hot cup of tea. The idea of using economy pack was to prevent wastage; if the bigger package was opened the biscuits would be spoiled due to high humidity. At home I invariably have my evening tea with couple of Parle-G biscuits. We buy bigger family package but store them in air-tight containers to prevent spoilage.

Recently my attention was drawn to an economic news clip that the leading food company Parle Products logged record sales of its very popular Parle-G biscuits during April-May 2020. It gained a market share of almost 5% in the highly competitive segment during the lockdown period of the pandemic. People stocked

up their pantries with Parle-G biscuits during lockdown. Further, the government agencies and NGOs preferred the most value package of Rs 2 of Parle-G as instant source of glucose. The company spokesperson said the growth (5%) of the brand was phenomenal that it had not witnessed such a thing in the last 2 to 3 decades!

It was not this pandemic alone, the company sources said even during tsunami and earthquakes, the sales of Parle-G had gone up, but not comparable to the present. No wonder people have that kind of dependency on the brand. Moreover, one can store the product for long time as it has reasonably long shelf life. When ‘unlock-1’ was rolled out in June 2020, I was in the neighborhood convenience store and asked for fresh package of Parle-G, the shopkeeper told, ‘Sir, this is the only fresh supply we have as there was no stock of Parle-biscuits left!’ The company had announced that it had donated 3 crore packs of Parle-G biscuits during

the peak of Covid19 pandemic. No wonder the highest growth rate among all biscuit brands during pandemic; said the shopkeeper of the brand.

There are so many chilling stories of migrants walking back to their native states with family and belongings. Some walked 500 to 600 kms in scorching heat of April-May to reach their villages in Uttar Pradesh. One construction laborer, a family of four (husband, wife and two children aged 3 and 7 years) had just Rs 100 on the day lockdown was announced. He was reluctant to accept food from the community kitchen (as he had come to the city to work and not to beg), bought some flour, tomatoes and two packets of Rs 2 Parle-G biscuits and started his return journey by walk carrying the younger child on the shoulder and elder walking along. At one point in the journey, the older boy was exhausted and unable to walk any further, so his mother offered him a Parle-G. The glucose biscuits offered a quick source of energy, and the boy was

ready to walk with his family! The biscuits could be trusted, for the level of energy they could deliver. Three days later, through a combination of walking and hitching rides with essential-goods trucks, the family reached home, having survived largely on food from volunteers along the way, as well as Parle-G biscuits.

It is not just the Rs 2 pack of Parle-G biscuits as the savior of the children of the above said labor but the larger issue is, in the narrative of a rising nation, many of the poorer workers who helped to build the new economy were forgotten, rendered invisible, squeezed into windowless rooms in slums, with limited access to clean drinking water and sanitation. The pandemic has exposed the vulnerabilities and inequities in our society.

In my earlier book (*Collection of essays 2020*) I had written about lockdown and social isolation stress.

Humans are basically social animals having certain patterns of habits and lifestyles. When this is disrupted as in lockdowns; everyone is experiencing some kind of stress. Some are not used to share living space full-time with others, many are in economic distress of losing the livelihood (more so the daily wagers) or suddenly stuck in a place and not able to get back to their loved ones or home etc. Many elderly and other people with dreaded diseases like cancer and kidney ailments are not able to get timely medical aid. Stress that the migrant laborers experienced during the pandemic was of different nature, very severe in type (uprooting from their livelihood place with family), not knowing how to get two square meals for the family and where to go in lockdown, no means of travel either by road or rail and above all no money to handle the crisis. The stress was both psychological and physical as some of them walked the distance all the way from their work places to home towns. Not an easy option but thousands of them took the plunge and walked, met

with accidents, tragedies and lost young and elderly on the way. It will take some years to unravel the story of India, particularly the deprived ones during the pandemic.

Acute stress of this type has great impact on hunger and satiety. Stress is also associated with emotional eating and an unhealthy dietary pattern. It (stress) can lead to decreased and/or increased eating behavior, depending on the severity of stress. Almost every system in the body is affected by stress. The most important one are the nervous, digestive and the circulative systems, more specifically the heart. Acute stressful situations as experienced by the migrants during the pandemic, particularly walking back long distances without any energy or food support would affect the total homeostatic mechanism of the body. Homeostatic mechanisms help to regulate the body functions which include organs, glands, tissues and cells so that the body can be constantly in a steady

state. The main mechanisms of homeostasis are body temperature, body fluid composition, blood sugar, gas concentrations, and blood pressure.

Stressful situations like the one experienced by the migrant labor during the pandemic is often associated with a greater desire for familiar and highly palatable energy rich foods. Sometimes, acute and severe stress like the migrants experienced may even reduce the food intake as the gastric emptying and shunting of blood from the gastrointestinal tract to muscles may take place. On the other hand chronic stress could elicit a more passive response driven by the HPA (hypothalamic pituitary adrenal) axis. The HPA axis is central to stress response in our body. The activation of the HPA axis results in the release of cortisol in the blood during stress. Its (cortisol) main role is in releasing glucose into the bloodstream in order to facilitate the ‘flight or fight’ response. This system works in a fairly straight-forward manner. With

increases in circulatory cortisol people may tempt to consume familiar, energy or carbohydrate rich foods that could potentially lead to weight gain and obesity. Stress can lead to binge eating in restrained eaters. Cortisol may also contribute to the accumulation of abdominal fat mass.

Disturbed eating attitudes are more prevalent in females than males. Female adolescents appear to experience stress more than male adolescents in terms of being need of social support and less optimistic. Higher levels of stress have been associated with a lack of adherence to physical activity. It is known that people in the age group of 14-18 years may perceive less stress than those in the age bracket of 19-25 years.

Back in 1936 Hans Selye, the father of ‘stress phenomenon’ had described the ‘general adaptation syndrome (GAS)’ as a response to changing environment around us. GAS as described by Selye is a

triphasic response; initial alarm reaction followed by a stage of resistance or adaptation, and eventually a stage of exhaustion and death. The Selye's concept involved activation of complex neurohormonal response namely HPA axis. The HPA axis is known to be involved in variety of neuroendocrine disorders such as anxiety, mood disorders, insomnia, posttraumatic stress disorder (PTSD), depression, chronic fatigue syndrome, and alcoholism. Drugs which are routinely prescribed for many of these illnesses, affect HPA axis function. Therefore, HPA is central to stress response. Several animal studies have shown that long-term social isolation induces increased neuroendocrine responses and stress reactivity.

The lockdown-phenomenon experienced all over the world is unique and very little is known about its long term effects ie; chronic isolation on the general population with respect to health and wellbeing. Work from home (WFH) concept and online learning (both in

schools and colleges) have already started showing fatigue (especially in young kids) and altered behavioral patterns in children and adults. Social isolation might lead to different behavioral disorder spikes to emerge. We have seen that lockdown-induced social isolation had tremendous spike on alcohol sale and its consumption once the restrictions were eased. The society is at risk of developing or encouraging drug and alcohol abuse (addiction) including mental disorders after the pandemic. Social scientists and psychologists will come up with several explanations and their impact on mental health. The silver lining is that some of those who have developed resilience, lockdown could be an opportunity to take stock of where we are in our lives and plan for the future.

15. Advantage in adversity!

As far back as I remember, almost every changing season all of us in the family would suffer from seasonal cold, sneezing, cough, mild fever and discomfort. These symptoms used to be mild and bearable. Children would take some days to bounce back, but neither I nor my better half was ever bedridden for seasonal cold symptoms. There is a famous saying, 'if you treat the cold, it would last for seven days; otherwise it will go away in a week!' In other words, these seasonal symptoms were short lived. If one had good immunity he or she would recover fast.

The very first winter I was in Jaipur for my higher studies, I had not experienced that kind of cold in winters in down south Karnataka during my growing up. My friends and colleagues told me to protect my chest and head from exposure to severe cold or changing weather. We try to practice this advice even

today during winters. The only thing I used to be worried about the cough that would persist for days and sometimes weeks even after recovering from cold symptoms. The dry cough used to be very discomforting particularly in the nights. Dry cough and sore throat used to be very discomforting if I had to deliver lectures or participate in the seminars. Dry cough is kind of familial (genetic) thing as my siblings also experience after the seasonal cold attack. A couple of years ago we were visiting our children in the USA in early spring (February-April). Usually that would be spring allergy period in the USA. School going children and working people take flu-shots. Our son asked us whether we wished to take flu-shot but we were not keen to get vaccinated against flu. In a couple of days we got over the cold and the discomfort but as expected it took some days for me to get over the dry cough. It was very annoying.

Exactly a year ago (March 23, 2020) total lockdown was implemented by the government in order to control the spread of viral infection. At that time we didn't know much about this mystery disease except that it had come from Wuhan in China. Last one year was so much different than previous any normal year. The year looked long with lockdown, plight of migrant labour, no school and colleges, no examinations, business and cinema halls shut down, no travel, no socialization, family functions like marriages postponed, all in all forced confinement, it was a global phenomenon. It had been a year of great human tragedy; many lost their livelihood, near and dear ones due to the pandemic in a short period. A new culture of online schooling and work from home (WFH) became norm of the day. The world slowly but steadily accepted the new norm and moved on. As we slowly return back to near normal life (hopefully) in the coming months and year(s) the impact of lockdown and homebound life will start surfacing. The behavioural scientists, sociologists and

psychologists (including psychiatrists) will analyse the outcomes of this gone by year. Domestic violence, breakups, mental depression and suicides is in the increase. Because of the scare of getting infected, patients with other ailments were hesitant to go to hospitals. Many private nursing homes and hospitals were converted in to Covid-hospitals.

The other day, I was checking my emergency medicine chest and found most of the cold remedies unused during the last 18 months are so. Think of it, neither I nor my better half experienced any cold symptoms during this period even though we had regular rainy and winter seasons. Trying to assess the reasons, we realised that the Covid-precautions that we practiced, namely gargling with lukewarm water in the mornings, drinking warm water containing turmeric and ginger, drinking ginger containing tea, and regularly doing breathing (pranayama) and yoga exercises besides my regular morning walks for an hour; perhaps kept us

protected from seasonal cold and cough. For me the greatest relief was the post-cold dry cough! I did not experience any annoying cough particularly in the nights during this period (advantage in adversity)!

Initially the advanced countries of the West like UK and UAS did not advocate use of masks and had to pay heavy human toll. The studies conducted in several countries have now revealed that those who mandated use of masks within the first 2-3 weeks of outbreak of infection was significantly contained the spread of the disease. In countries who did not implement mask-wearing as a public safety requirement, observed higher rates of mortality due to Covid 19. The Lancet report said countries that mandated masks within 15 days of the disease outbreak had mortality rates less than 1 per million populations. Although we do not have any such public safety data on use of mask, India implemented lockdown much earlier in the pandemic which turned out to be a life saver. Health agencies and

the scientific communities around the world have strongly recommend that wearing mask and observing social distancing are key to prevent spread of infection. Given the threat of asymptomatic people unknowingly transmitting the virus, both mask and social distancing are important measures in prevention of spread of the Covid 19 infection.

For us one most underlying fact to be protected from annual cold and cough was wearing mask, social distancing, frequent hand wash, and observing other measures such as gargling, breathing exercises etc. Truly they turned out to be weapons of mass destruction! What India saw the devastating effect of super-spreader 2nd wave and the warning or the scare of the 3rd wave around, medical authorities all over the globe are advocating wearing double masks. At least I have started following double mask policy whenever I get out of home. Vaccination against Covid19 is surely a protection 'kavacha' until we have specific drugs for

the disease. Many health and economic experts advocate that, ‘Masks can not only help protect individuals but protect economy too!’

Post script:

There has been a debate as to why the mortality rate was very low in India during the 1st wave of Covid 19, ie; April-May 2020. Of the many arguments, the most prominent being low obesity or overweight issues amongst Indians as compared to Western population. In fact obesity has been recognised as a risk factor for severe Covid 19 infection. The Centre for Disease Control (CDC) USA has correlated between body mass index (BMI) and risk for severe COVID-19 outcomes (i.e., hospitalization, intensive care unit (ICU) admission, invasive mechanical ventilation, and death). The report went on to say that between March and December 2020 nearly 80% of the 200,000 Covid-patients admitted to a hospital facility in the USA were either overweight or obese. A more recent report based

on Covid 19 mortality rates in 160 countries published in early March 2021, revealed those countries with more than 50 percent of the population classified as overweight showed higher rates of death. Countries like South Africa and Brazil where overweight and obesity is common among its majority of citizens, there has been high rate of mortality amongst Covid 19 patients. Whereas in advanced countries like Japan and South Korea people are not overweight or obese, the Covid 19 related deaths are far less.

Obesity is known to disrupt immune and thrombogenic responses to pathogens and impair lung function from excess weight. Obesity is a risk factor for type 2 diabetes, heart disease, and some forms of cancers. These co-morbid states contributed significantly to high mortality rates in Western population affected by Covid 19. As of now we do not have such authentic data or information on Indian Covid19 affected patients and their cause for mortality. Some early indicators

suggested underlying co-morbidity (mostly undetected/reported) could have been the cause for high mortality rates particularly in young population during the 2nd wave (Feb-May 2021).

Post Covid new normal: Digital nomads:

One may call it a new cultural or work phenomenon, a follow out of Covid19 pandemic. Traditionally we referred to shepherds as nomads who move from place to place with goats to feed. It was also quite common in the USA during 1950s and '60s when boys and girls going to Europe (ten dollars-a-day adventure) in summer like nomads. In recent times many youngsters lived like 'nomads' for a few years after the college, never sticking to one job in one place. Pandemic has thrown open a new phenomenon called 'digital nomads'. Digital nomad is someone who has no fixed residence and can easily be relocated himself or herself still being able to connect and do the task or work responsibilities. That gives an opportunity to work

Advantage in adversity! / 150

from anywhere and all one needs is a laptop and strong internet connection. When the 1st lockdown was announced in March 2020 not only the migrant labor fled the cities but techies moved to their home towns for safety. Working from home (WFH) or remote working mode became the ‘new normal’ of office. WFH or remote working has become more or less permanent way of function. The devastating 2nd wave of Covid19 made many to move to exotic locations or travel from one place to another without hampering the flow of work as long as they had good connectivity. ‘Working from beautiful locations motivates many to perform better’, said many youngsters. Remote working or digital nomads has now become the new normal.

TB-Covid outreach:

‘In every adversity lies an opportunity’, said Dr Harsh Vardhan, the Union Health and Family Welfare Minister on the occasion of World Tuberculosis Day on 25th

March 2021. ‘Pandemic has provided us with one to augment TB elimination efforts by strengthening our public health system and infectious diseases control actions. Dedicated infectious disease hospitals that are being established as part of our pandemic preparedness and response, will contribute significantly to TB care and management. We’ve also ramped up molecular diagnostic capacities across the country including in rural areas to ensure that rapid and accurate diagnosis is available in a decentralized manner. Renewed focus on infection control will alter the transmission dynamics, particularly in health facilities. Cough hygiene, use of masks, social distancing, when sustained, will further contribute to reducing transmission of respiratory illnesses such as TB’, unquote.

‘Additionally, we have started bi-directional TB-Covid screening and screening for TB among Influenza Like Illness/ Severe Acute Respiratory Illness (ILI/SARI) cases. With the ease in lockdown restrictions TB services

Advantage in adversity! / 152

are returning to normal with more and more people approaching both government and private health clinics to get themselves tested. To facilitate free TB care in the private health care sector, public-private partnerships are being launched in over 350 districts across the country. Our community outreach has ensured improvements in counseling, contact tracing, disbursement of nutritional support etc', said the Minister.

16. The beard that says it all!

I was at the Chandigarh railway station to receive our children (Setu, Amarantha and grandson Vikram, and our second son Girish) who were arriving from New Delhi by the morning Shatabdi train. They had landed in Delhi from USA on the previous day and had taken the morning train to reach the City Beautiful. We had not seen them in a while, particularly our grandson Vikram. As the train came to a halt on platform, Setu and family got down but I did not see Girish. I asked Setu, 'Where is Girish?' 'Dad, I am here just behind you,' replied Girish. With his new face look with beard I had missed him to recognize! This was some 4-5 years ago when youngster growing beard was not that common.

My first job was in a multinational company, CIBA (Bhandup) in Bombay (now Mumbai). I was just 21 years of age. The first day I reported to the plant

manager, he gave me and other new entrants a tour of the factory and distributed training schedule along with his usual sermon of dos and don'ts which included punctuality, work ethics and presentable attitude. He was known for his discipline. Until then I was not shaving regularly as beard was not that conspicuous on my face but his instructions made me to take regular shave every morning. It is 55 years since then that I shave every day even though I am superannuated now and have no appointments or presentations to make. As a matter of fact I feel uncomfortable if I do not take shave every day, kind of psychological or self-imposed discipline.

With turn of the century and new generation (Boomers, OK Boomers to millennial) the life has come 360 degree, no one feels shabby any more if one doesn't take a shave or wear a torn jeans. Growing beard is a cultural phenomenon now. Both of our sons shave when they have either board meetings or meeting a

delegation at the work places. For us as parents, seeing them without beard is strange as we see them with beard every day on video calls.

As the famous say goes, ‘your style says a lot about your identity. Beards, moustaches or clean shaven are all stylistic choices that can affect the way people view you’. For example, women perceived male facial hair or beards associated with increased masculinity, aggressiveness and/or a more dominant character. There was a time when society perceived men with beard committed crimes. Now, the reverse is equally true, ie; bearded men are trustworthy, having better social skills, more matured and employable! Biologically speaking, testosterone, the male sex hormone is responsible for the beard to grow and for some of the above perceived traits.

The founding presidents of United States of America (as many as 14 of them) had kept facial hair, sideburns, beard or mustache or both. The facial features of

Abraham Lincoln, 16th President is well imprinted in our mind as the US hero who abolished slavery and won the civil war for his country. However, in the 20th century barring two presidents none had facial hair, sideburns, beard or mustache. Social scientists have researched the effect of facial hair or beard on the electability of presidential race, and strongly believed that facial hair would have a negative effect on the electoral prospects. Today, facial hair (beard or mustache) on potential presidential candidates is considered as a harmful factor.

Among the global leaders of yesteryears, most charismatic Cuban leader Fidel Castro supported beard. Among the present leaders our Prime Minister Narendra Modi stands out conspicuous with his 'sage's beard' looks. The ruling party may argue 'sage's beard' look has anything to do with Bengal election but the Indian media dissects and debates. None the less creating a persona that reminded the people of West Bengal of their favorite son, Guru Dev is a matter of

conjecture. No opposition party has complained to the Election Commission saying that it violated ‘model code of conduct!’

Interestingly, six of the ten billionaires of India have mustache (one has full beard). The one time gentleman game of cricket where players were clean shaven, white clothed and with neat appearance, in contrast the current playing eleven of Indian test match team lead by Virat Kohli, almost all of them support beard. Their beard does not look like careless attitude or lack of time to be clean shaven but clearly well groomed display of winning attitude or expression of dominance. The beard appearance is seen in players of other two formats namely ODI and T20, not only that even their bench strength also follows the same appearance.

To support the argument, a recent study (2016) drew conclusion that men with beards were thought to be more dominant. The beard psychology, even though not clear about the perceptions of masculinity and aggression, supporting beard has made an impact

The beard that says it all! / 158

amongst men of all age groups that supporting beard helps to influence people's opinions. However, with all the conflicting information and argument, it's best to simply choose the look you like the most!

17. French lilac to *panacea* drug!

It is one of those rare things in the modern history of drug discoveries that a molecule once discarded due to its side effect could become first-line medication for one of the most devastating diseases of our times. Not only that the drug completed more than 60 years of its successful clinical use without much pomp and show! Interesting enough the drug had its origin from plant source.

As an undergraduate student of pharmacy in the 1960s we learnt about phenformin and metformin the two biguanides as oral hypoglycemic agents used in the treatment of diabetes mellitus. At that time all that we were taught was they acted by increasing the peripheral utilization of glucose and also known to produce lactic acidosis as a side effect. Phenformin though approved for human use, was withdrawn from the market in most of the countries because of the side effect. Metformin

French lilac to *panacea* drug! / 160

was not approved for human use in the USA until the 1990s.

Before the discovery of insulin by Banting and Best (also Macleod) in 1921, the cornerstone of diabetes treatment was diet and exercise. Arrival of insulin changed the approach to diabetes management and the lives of millions of patients. At one time insurance companies were hesitant to insure people with diabetes. Thanks to insulin, the longevity of diabetic patients has not only increased but they lead near normal life and even participate in almost all competitive sports. In the beginning administration of insulin was a challenge but now the patients do self administration easily. Soon efforts began to discover oral therapy for the disease. The hypoglycemic effect of guanidines was discovered around 1919 and soon phenformin and buformin were introduced in to therapy. Phenformin was withdrawn in 1932 due to toxic side effects. Metformin has to wait

for another 20 years to be approved for clinical use, more so in the USA.

The discovery and the clinical use of biguanides especially metformin as oral hypoglycemic agent had a checkered history. The use of blooming *Galega officinalis* (French lilac, also known as Goat's rue) was known since the medieval times. *G. officinalis* was used to relieve intense urination accompanying the disease which was later recognized as diabetes mellitus. *G. officinalis*, was also used to treat plague epidemics as it promoted perspiration and as a galactagogue in cows. The active ingredient in the French lilac that produced the lowering of blood glucose was identified as galegine or isoamylene guanidine. A curious chapter in the history of guanidine-based hypoglycemic agents arose from the mistaken notion that the tetany of hypoparathyroidism was due to the production of increased guanidine following parathyroidectomy that led to the

demonstration that an infusion of guanidine produced lowering of blood glucose. While guanidine itself and its derivatives were too toxic for the treatment of diabetes mellitus, but the biguanides (two linked guanidine rings) proved useful in the treatment of diabetes. Three biguanides (phenformin and buformin, later metformin) became available for diabetes therapy in the 1950s. Phenformin and buformin, were withdrawn due to severe side effects particularly lactic acidosis, and cardiac and hepatic toxicities. Metformin, a less lipophilic biguanide, was found to be safer and first used in Europe. Almost 20 years later it was approved for use in the USA in 1995.

All the three biguanides, phenformin, buformin, and metformin were synthetic compounds having two guanidine molecules. They are more lipophilic as compared to plant-derived parent compound. Emil Werner and James Bell (1922) first described metformin as a byproduct in the synthesis of *N,N*-

dimethylguanidine. In 1929, Slotta and Tschesche discovered its sugar-lowering action in rabbits, describing it as the most potent biguanide analog as hypoglycemic substance. French physician Jean Sterne began to study the effects of metformin in humans in the 1950s and it was introduced as a medication to treat diabetes in France in 1957. It was sold in the name 'Glucophage' (glucose eater). After intensive scrutiny metformin was introduced in the USA in 1995. Subsequently, the UK Prospective Diabetes Study (UKPDS, 1998) demonstrated the long-term cardiovascular benefits of metformin providing a new rationale to adopt metformin as initial therapy to manage hyperglycaemia in type-2 diabetes mellitus (T2DM). Sixty years (precisely 64 years) after its introduction in diabetes treatment, metformin has become the most prescribed glucose-lowering medicine in the world.

The primary action of metformin, ie; the glucose-lowering effect has multifaceted mechanisms. It mainly reduces hepatic glucose production via gluconeogenesis, increases peripheral glucose utilization (predominantly through a stimulation of insulin-mediated muscle glucose uptake and glycogen synthesis), and has positive effects on insulin receptor expression and tyrosine kinase activity. Interestingly, another important but often overlooked property of metformin relies on its beneficial effect on the blood lipid profile, which is characterized by a significant reduction in circulating triglycerides (TGs) and VLDL (Very Low Density Lipoprotein) cholesterol and increased HDL (High Density Lipoprotein) cholesterol levels. This metabolic property might partly be involved in its (metformin) cardioprotective effect observed in obese patients. In addition, metformin is known to suppress the gluconeogenic effects of glucagon and to increase the translocation of glucose transporters to the cell surface. However, the exact

molecular cite of action of metformin remains obscure. The recent studies have shown that metformin activated hepatic AMP-activated protein kinase (AMPK), emphasizing the putative role of this energy-sensing kinase in the mechanism of action of the drug. The United Kingdom Prospective Diabetes Study (2002) has shown that metformin proved to be effective in decreasing diabetes-related death, myocardial infarction, and stroke.

Metformin has low risk of producing hypoglycemia as compared to sulfonylureas (from tolbutamide, gibenclamide to glimepiride to glipizide etc). However, one need to be watchful of hypoglycemia effect due to intense exercise, calorie deficit, or when used with other hypoglycemic agents in T2DM.

Metformin and gliclazide are the only two oral glucose-lowering agents mentioned in the WHO Model List of Essential Medications. It is available as a generic

medication. In 2017, metformin was the fourth-most commonly prescribed medication in the United States, with more than 78 million prescriptions. Metformin was prescribed for 83.6% of T2DM patients in the UK in 2013. Annual demand for metformin is 23,000 metric tons. The recommended doses are 500 mg once a day or 500 to 1000 mg twice a day taken along or after the meal. It is available as immediate release (IR) or extended release (ER) formulations. Metformin is generally well tolerated and produces a significant reduction in A1C levels (~ 1.5%).

Over the years the clinical data has shown that there was no definitive link between metformin to lactic acidosis (9 per 100,000 persons per year), the incidence is almost same as to the rate of lactic acidosis found in the general population. However, when used in very large doses or in patients with kidney or liver disease it may produce high blood lactic acid level. Metformin is a preferred drug in gestational diabetes over insulin. It

is marketed (Glucophage) in several popular brand names and also in combination with sulfonylureas (metformin 500 mg plus glimepide 1 or 2 mg; Glycomet GP-1 or GP-2). It has become the first-line of treatment in T2DM particularly in people who are overweight.

In spite of a *checkered* history, the use of metformin as the oral glucose-lowering agent in the management of T2DM has completed more than 60 years. It is the first-line medication in T2DM and even in some juvenile diabetes. Metformin has become a *panacea* drug to treat myriads of diseases from T2DM, cardiovascular risks, life extension for pancreatic cancer patients, polycystic ovarian syndrome, oncogenic tumors and now undergoing clinical trials for breast cancer.

18. Tryst with indigenous plants: *Ashwagandha* and *Turmeric*

The Ministry of AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy) Government of India has recommended various Ayurvedic measures to boost immunity during Covid19 pandemic. Amongst the home remedies recommended are Tulasi (*Ocimum sanctum*), Ashwagandha (*Withania somnifera*), Turmeric (*Curcuma longa*) and many such other plants. The demand of these plants and their commercial products has increased many folds during the Covid19 pandemic. For example turmeric, the golden spice has hit a new high in terms of its commercial price, almost Rs 8000/- per quintal (9% increases!). Similarly, the export of raw turmeric has suddenly shot up from 300 kg everyday in February to 3 tons per day in April 2020 (a jump of 300%). Owing to its medicinal benefits and adaptogenic properties, turmeric

has a long legacy of being used as a healing and reviving spice. The recent bibliometric documents show nearly 19000 scientific publications on various medicinal values of turmeric (curcumin). The medicinal indications included about its effects in various types of cancers (from breast, colon, colorectal, pancreatic, to prostate cancers), inflammation, and oxidative stress. Because of its poor bioavailability (only 14%), it doesn't easily cross the blood brain barrier (BBB) and therefore, its use in CNS disorders is limited.

It is not unusual for any young or budding pharmacologist in our country to start his research career with herbal drugs. I was no exception; my first research project was on the pharmacological investigation of *Berberis asiatica* (Berberine hydrochloride). That was 52 years ago! (After almost four decades I revisited berberine investigation for some other properties of the drug). But the next twenty

Tryst with indigenous plants:

Ashwagandha and *Turmeric* / 170

years of my research career, I was engaged in understanding the mechanism of action of one of the widely used class of anti-anxiety drugs namely benzodiazepines, more specifically diazepam. In the 1960s nothing much was known as to how this class of drugs relieved anxiety. They were called minor tranquillizers. In the 1970s the whole area of neurotransmitters (NTs), particularly the role of epinephrine and norepinephrine in autonomic and central nervous systems was getting unraveled. Nothing much was known about gamma-amino butyric acid (GABA) or serotonin as neurotransmitters in the nervous system. My earlier work on dopamine, another emerging NT (often called the darling of neuroscientists) at that time made us to focus on yet another fascinating and emerging concepts in GABA-receptor pharmacology. Our approach was very intense and equally rewarding. We did not have the facilities of modern tools and equipments in receptor biology yet our approaches were simple and well defined to

address the issue on hand. Our observations were not only published in leading journals in neurosciences and psychopharmacology but my laboratory also received recognition for neuro-psychopharmacology research. I received the most prestigious visiting assignment, 'Fulbright visiting professorship' of the US Education Foundation. I spent nearly two years in one of the advanced laboratories of the University of Texas Health Sciences in Texas, USA. Unlike the other visiting professors, I made the best use of the opportunity to get hands-on experience on receptor binding studies of GABA-receptors which was then considered to be the molecular approach in receptor biology. On returning to India my research work was mainly focused on GABA receptor pharmacology besides other emerging areas like mental depression, pain and inflammation, and herbal pharmacology.

GABA receptor concept was very attractive not only to explain the mechanism of action of benzodiazepines

Tryst with indigenous plants:

Ashwagandha and *Turmeric* / 172

(diazepam related molecules) but also that of barbiturates, alcohol and most importantly the GABA receptor modulation in epilepsy. Our studies proposed dual concepts of agonists and inverse agonists modulating GABA-Benzodiazepine receptor complex; one being inhibitory in nature and the other possibly involved in excitatory function. This concept helped to explain withdrawal response to addicting drugs like alcohol and opioids.

***Withania somnifera* (Ashwagandha)**

It was unusual at that time (1980s) to study evidence-based approach in herbal (Ayurveda) therapy. Most of the herbal remedies were/and are multi-component (cocktail) preparations and used on empirical or observational-basis. It is difficult to pin point their potential application to any one or single component. It is always interpreted as sum of total effect. Two herbal major companies approached me to investigate the pharmacological actions of their products for the

involvement of GABA receptors. But we focused our approach on one single plant preparation namely *Withania somnifera* (Ashwagandha). The pharmaceutical company provided us the pure root extract for the studies. The other herbal company had a multi-component preparation (BR-16A) and they wanted us to develop general application of the preparation in learning-disabilities. Our studies revealed its potential in learning disabilities and attention deficit disorder. BR-16A was subsequently developed as a commercial product and sold as 'Mentat^R'.

Withania somnifera (Ws), popularly known as Ashwagandha is widely considered as the Indian ginseng. In Ayurveda, it is classified as a rasayana (rejuvenation) and expected to promote physical and mental health, rejuvenate the body in debilitated conditions and increase longevity. Having wide range of activity, it is used to treat almost all disorders that

Tryst with indigenous plants:

Ashwagandha and *Turmeric* / 174

affect the human health. Our focus was on the pharmacological basis of its use in various central nervous system (CNS) disorders, particularly its indication in epilepsy. We also studied the related areas such as stress and neurodegenerative diseases like Parkinson's and Alzheimer's, movement disorders (tardive dyskinesia), cerebral ischemia, and even in the management of drug addiction.

In various animal models of epilepsy the root extract of *Ws* showed the protective effect against seizure-challenges; more specifically, against pentylenetetrazol (PTZ)-seizure threshold in mice. *Ws* increased the seizure threshold for generalized clonic and tonic extension phases of the PTZ. The biochemical and receptor modulation studies carried out in our and other laboratories clearly demonstrated that *Ws* root extract increased [^{36}Cl]-influx suggesting GABA-mimetic activity. In kindling (PTZ) model of epilepsy (considered a prototype of chronic epileptic episodes)

Ws effect was comparable to diazepam. Diazepam completely abolished the clonus phase in kindled animals when re-challenged with PTZ on both days 3 and 10. In animals treated with *Ws*, none of the animals went into clonus phase on day 3 after the last PTZ challenge. On day 10, only one out of ten animals showed the clonic seizure phase. Our studies further implied that both diazepam and *Ws* could inhibit the development of chemical kindling caused by PTZ by GABAergic mechanisms. *Ws* extracts were also investigated in lithium-pilocarpine model of status epilepticus in rats. *Ws* enhanced the effect of both diazepam and clonazepam in this animal model, further confirming our GABAergic hypothesis. *Withanolide-A*, an active constituent of *Ws* showed neuroprotective effect via inhibiting neuroinflammation in pilocarpine-induced status epilepticus.

In our country, Ashwagandha (*Ws*) is the fourth most consumed medicinal plant in terms of volume.

Tryst with indigenous plants:

Ashwagandha and *Turmeric* / 176

Particularly after the pandemic, its routine use has tremendously increased from boiling it with tea leaves to other type oral consumable application. As we come to know more and more about its science or evidence-based use in various health conditions, it will be immensely economically important medicinal plant for commerce.

***Curcuma longa* (Turmeric)**

The cover page of TIPS (Trends in Pharmacological Sciences) 2009 February issue had colourful picture of customary application of turmeric powder paste to Indian bridegroom at the time of marriage. The article said that 90% of the world supply of golden spice was from India. It further said that by 2009 some 688 studies have been published on the medicinal value of curcumin out of which nearly 400 articles referred to its anti-carcinogenic properties. In December 2020 this number has gone up to 19,000 publications and many patents! Turmeric held a share of 11 per cent in volume

and 6 per cent in value of the export basket, with an export of 136,000 tons valued at Rs.1216.40 crores. During the pandemic situation, the export of turmeric, a spice with immunity boosting properties, has recorded an impressive growth of 42 per cent in terms of volume during the first half of 2020-21 (Spices boards, Buyers and Sellers Virtual Meet, 2020-21).

The main curcuminoid found in the golden spice turmeric, is a plant alkaloid obtained from *Curcuma longa* (Fam.: Zingiberaceae). It has been used in the Indian systems of medicine to treat variety of disorders from wound healing, sprains, gastrointestinal, pulmonary, and liver disorders. Many pharmacological studies have shown that curcumin possessed antioxidant, anti-inflammatory, anticarcinogenic, antimicrobial, hepatoprotective, hypoglycemic, thrombosuppressive, and antiarthritic activities. There were hardly any research publications on the effect of curcumin on brain in 2009 because of its poor

Tryst with indigenous plants:
Ashwagandha and *Turmeric* / 178

bioavailability (14%) but in the last 10 years there has been an exponential increase in the trend of research exploring the efficacy of curcumin in neuroprotection. Curcumin has demonstrable effects in Alzheimer's disease, Parkinson's disease, schizophrenia, drug addiction, Prion's infection, traumatic brain injury (stroke), aluminum neurotoxicity, epilepsy, and diabetic neuropathy; and the list is ever growing. Similarly, a number of studies have shown that it modulated a good number of cell-signaling pathways accounting for its biological activities.

Further, epidemiological studies have revealed that people consuming curcumin in daily life have sharper brain functions and higher cognitive abilities. Curcumin possessed some interesting properties that justify its use even in major depression. These properties include: (i) Curcumin being an inhibitor of monoamine oxidase (MAO) enzyme. The MAO enzyme is expressed on the outer membrane of

mitochondria in most of the body's cells, where it is involved in catalyzing the oxidation of monoamines. It is known to exist in two isoforms, MAO-A and MAO-B. MAO-B is the predominant form of the enzyme in the human brain and oxidizes dopamine, whereas norepinephrine and serotonin are the preferred substrates for MAO-A. Interestingly, curcumin possessed both MAO-A and MAO-B inhibiting properties; (ii) Curcumin modulated the level of various neurotransmitters, levels of norepinephrine, dopamine, and serotonin respectively in the brain. Norepinephrine is involved in attentiveness, emotions, sleeping, dreaming, and learning. Dopamine is involved in pleasure, emotion, and regulating locomotion, while serotonin has a major role in neurovegetative functions of the body, such as appetite, sleep, memory and learning, temperature regulation, mood, behavior (including sexual and hallucinogenic behavior), cardiovascular functions, muscle contraction, and endocrine regulation. Further

Tryst with indigenous plants:

Ashwagandha and *Turmeric* / 180

curcumin promotes hippocampal neurogenesis, has an ability to increase the levels of brain-derived neurotrophic factor (BDNF). In one of the studies carried out by us and others curcumin at a dose range of 10–20 mg/kg enhanced hippocampal neurogenesis in stressed animals. The results were comparable to imipramine, a tricyclic antidepressant. The exact mechanism of curcumin's neuroregenerative ability is not clear, but is hypothesized to prevent stress-induced decrease in serotonin 5-HT_{1A} mRNA and BDNF protein levels in the hippocampus. Furthermore, curcumin reversed chronic stress-induced reduction in BDNF protein levels. In vitro studies conducted in cultured rat cortical neurons have depicted that curcumin also reversed glutamate-induced decrease in BDNF levels; (iii) Curcumin possessed anti-inflammatory properties. Inflammation is known to play a major role in the pathophysiology of major depressive syndrome. The role of T-cell dysfunction in the pathophysiology of depression has been reported.

There is a predominance of cytokine-producing helper T cells, type 1 (Th1) or type 2 (Th2), in major depression. As a potent anti-inflammatory compound, curcumin inhibits the cyclooxygenase-2 (COX-2) isoenzyme. Moreover, it inhibits transcription of nuclear factor- κ B (NF- κ B). Curcumin blocked the synthesis of inducible nitric oxide synthase (NOS) enzyme, thus reducing the release of inflammatory NO. In one study, curcumin was found to lower the levels of interleukin (IL)-1 β cytokine by approximately 60%. Further, curcumin at lower doses reduced the expression of inflammatory markers of astroglial cells. The anti-inflammatory activity of curcumin is comparable to the blockers of tumor necrosis factor-alpha (TNF- α). Therefore, based on the above evidences, it can be hypothesized that the anti-inflammatory property of curcumin contributes to its antidepressant activity.

Future prospects

Tryst with indigenous plants:
Ashwagandha and *Turmeric* / 182

Notwithstanding the availability of several new synthetic molecules to treat a variety of diseases, the natural products have had their own identity and efficacy in alleviating human suffering since time immemorial. Curcumin is one such valuable home remedy widely used by both rural and urban India. Modern scientific evidences have unequivocally demonstrated its therapeutic potentials in variety of clinical conditions. However, to meet the modern safety requirements and evidence-based use, it is required to generate more clinical data based on Good Clinical Practice trials. The exact mechanisms of action(s) of curcumin are in quandary, need further exploration.

Besides, Covid19 has opened up new vista for curcumin namely its potential as an adaptogenic drug. Future is holding for the golden spice of India as a magic remedy!!

Kulkarni, SK and Dhir, A: Prog
Neuropsychopharmacol Biol Psychiatry, 32:1093-105
(2008); Kulkarni, SK, Dhir, A and Akula, AK:
TheScientificWorldJournal, 9:1233-41 (2009)

19. The Two Theatres

Guru, the patriarch, is nearing 70. His weakening hearing, it seems, has done him more good than not. His memory has more been sharper in years. He is able to access information stored away in his mind with precision, unencumbered by the noise that he no longer hears. He can tell you the who, the what, the when and the where. With that information, it is easy for him to piece together the “why”. Of late however, he appears debilitated because the “why” behind his current predicament evades him. He is unable to make sense of why he and his wife have new roles in the family: they are acting parents to two toddlers, their grandchildren. Guru, it appears, is living a two-speed life these days. *On one hand*, in the foreground, Guru handles the family’s Covid-situation as rapidly as it unfolds. He is the protagonist of the urgent and uncertain drama that this has become, unlike the arm-chair critic of the ensuing T20 tournament that he is. In the past fortnight,

both his sons (twins) have tested positive for Covid19 as have his daughters-in-law. Guru's role at home has transitioned from the arm-chair critic to the protagonist as he and his wife embrace their new active roles in their grandchildren's lives. The level of activity in Guru's retired life has peaked twice in the last week, with each couple testing positive in succession. The activity level for the retired couple is like what it was when they were raising their then toddler twin boys. Guru and Rama, his wife was 30-something then, pushing forward in life with the tail-wind of invincibility that their 20s begot.

On the other hand, in the background, Guru's subconscious is assimilating the events of the day as it tries to shape the unseen and unknown that is yet to come. Guru's sudden reticence from the verandah of our extended family's digital home- the WhatsApp group, gives Guru the uninterrupted pause he needs to take control as the patriarch as the virus ravages within his kin. As for his reticence, the extended family sees

him as being secretive. In their zeal to appear empathetic, they fail to empathize; after all their well-meaning but useless sympathy and advice is noise to Guru as he deals with the situation. Over the last week, the family WhatsApp group has become quieter than usual except for a handful of banal messages.

Oh! the plight of Guru and his family, the grimness. He does not have the luxury to think in simple thumbnails about the years ahead. He is forced to contend with the richness of details in the hours unfolding in front of him.

A celebration is being planned on the other side of the globe to celebrate years, a full forty of them for Santosh. Santosh, like Guru, has lived life king-size. In his 40 years, Santosh has looked up to his paternal uncle, Guru, as a friend-like father figure.

A surprise birthday party is being coordinated on another WhatsApp group. This WhatsApp group is

abuzz with activity and is at the top of the list on the WhatsApp screen. The quiet on the family WhatsApp group has pushed it down and out of the main screen. The pain of Guru's family and the uncertainty of the days to come have faded into the background on our WhatsApp screens. Like Covid, their pain is out of focus, but not forgotten.

Santosh has a full-day ahead of him. He, it appears, is living a two-speed life today.

On one hand, in the foreground, Santosh is reacting to the surprises unleashed on him: jumping in and out of random activities and events strung together to please him. Waking up to a quiet morning and getting the time to drink a cup of coffee is a surprise like no other. His kids have slept in for longer than usual. His wife has planned a golf outing for him with friends. As she pushes him out of the house, others from within their Covid bubble ship in to decorate the backyard. Santosh

arrives to his favorite melodies sung live by a singer his wife has hired.

On the other hand, in the background, Santosh is pensive as he reflects on the inflection points in his life-journey, the left and right turns that led him to now. Santosh is uncomfortable as he is extolled and pleased throughout the day. He recedes from the center of the attention to partake in the pretend-kitchen games of the four year olds at the party. He is back at the center of attention as evening makes way for dusk and the frolic makes way for the grand finale. The grand finale of the surprises is predictable yet anticipated - a Zoom call with friends and family where Santosh's endearing traits are eulogized as the Zoom attendees recount their favorite memories with Santosh. With nowhere to recede from the attention, Santosh starts reminiscing about his late father to cope with the discomfort of being the center of attention. His father was Guru's eldest brother.

The Zoom event is where the two theatres coincide - well almost. The attendees of the Zoom event are the same people who are in the quiet family group. They, like me, must be trying to reconcile the two theatres that they are witness to. One one-hand misery, and on the other hand elation. Like Guru's grandson, who keeps running between his parents' empty room and his grandparent's room, we are running between these two theatres.

How does one reconcile the two theaters?

Both the theatres have never been far from my mind. But up until now, I have managed to keep both the theatres one removed from the other.

When I speak to my father about his younger brother Guru's plight, I anecdotalize Santosh's 40th birthday in its own compartment. When I am celebrating Santosh's birthday, I anecdotalize Guru's plight in its own compartment.

I realize that the antidote to my conflict is not in reconciling the two theaters. The antidote to my

conflict is in compartmentalizing the two theaters - and plays my role as an independent observer to both.

I am not Guru. I am not Santosh.

Contributed by Setumadhav Kulkarni

Post script:

When the curtains were drawn in the second theatre, it was still intermission in the first theatre. The real climax was to yet unfold. Guru had not imagined that he would be hospitalized due to Covid19. Initially comfortable, the air-conditioned room, special attention etc; but when the torturous battle with Covid19 began though short lived, sharing the hospital room with his second son Guru was not himself. He was made to taste the bitter pill before both safely got home, Guru not as the commander-in-chief but as a wounded soldier who is recouping!

20. Jobs (jobs) for all!

The ‘world’s largest adult vaccination programme’ was initiated in India on 16 January 2021. On the occasion our Prime Minister said that India is entering a decisive phase of vaccination in the fight against Covid19. The two made-in-India Covid19 vaccines, Covaxin by Bharat Biotech, Hyderabad and Covishield (AstraZenica-Oxford) by Serum Institute of India (SII), Pune approved for emergency use are being administered in a predetermined phases. The government followed the WHO norms of first inoculating the healthcare worker; frontline doctors, nurses, paramedics, sanitation workers and the police. When this was achieved, people above the age of 60 and people above 45 years of age with co-morbidity are being be vaccinated.

In the **first phase of vaccination**, it was expected to cover nearly 3 crore people and the cost of vaccination to be borne by the government. The PM

has also said that these two vaccines are more cost-effective than any other in the world and that India's vaccine production and delivery capacity will be used to help all humanity in fighting this crisis.

Covaxin is an inactivated vaccine whereas Covishield is a live vaccine. Both the vaccines have gone through preclinical and clinical trials in India. They are found to be safe and have no major side effects, other than minor pain, occasional fever and tenderness at the site of injection. They are administered in two doses with a gap of 28 days between the 1st and the 2nd dose. This period has been now extended to 45 days as better antibody production is expected. As the new schedule is being followed now, new clinical data emerging from various countries including limited observations from our own country suggest that longer gap between the two doses (say up to 4 months) would produce better immunity and offer

protection. This may give an additional opportunity for more people to be vaccinated during the waiting period.

Challenges:

In the beginning many doctors expressed their reservations or hesitancy in getting vaccinated especially with Covaxin (Bharat Biotech). Their contentions were that the vaccine against Covid19 cannot be made in such a short time of less than a year and phase-3 clinical trial data of Covaxin not yet known. Further, the government has given approval for emergency use in a hurry. The government on its defense said that safety and efficacy were not compromised in giving the approval. Many senior doctors from ICMR and AIIMS were vaccinated with Covaxin. In fact the PM, he and many of his cabinet colleagues took Covaxin. In order to avoid this confusion, ie; which one to be chosen the government made it clear that both the vaccines are equal and

recipients have no choice of selection. A large number (62%) of Delhi-based doctors were hesitant to get vaccinated. The government reported that the side effects noticed were only 0.002% in vaccine recipients. The vaccine related controversy was put to rest as more and more eligible people started getting the jabs including doctors. In fact all Covid19 vaccines currently available (in the USA and WHO) have been shown to be safe and effective against Covid19.

The other question often asked, ‘how safe one is from getting infected after both the doses?’ The clinical data available so far suggests that in all probability people who have taken both the doses are less likely to get Covid19 infection and even if they get the infection, it would be mild and will not be needing hospitalization. Different Covid19 vaccines have varying outcomes and it is too early to draw universal conclusion. But one thing all experts opine is that getting vaccinated may protect people around, particularly people at increased

risk for severe illness from Covid19. Even one is fully vaccinated it is important to observe Covid19 appropriate behaviors of hand sanitization, masking and keeping social distance. In the coming times we may learn more about how vaccination may reduce spread of the virus that causes Covid19.

It takes about two weeks after the 2nd dose of any of the Covid19 vaccines to be considered as fully protected or vaccinated. People who have had Covid19 infection before or recovered from the infection may show some protection due to natural immunity (basis of plasma therapy was advocated earlier). But it is short lived and re-infection has been reported. Such individuals are also advised to take Covid19 vaccination. The risk of severe illness and death from Covid19 far outweighs any benefits of natural immunity. Vaccination will help to produce antibody response and prevent from severe illness. Both natural immunity and immunity produced

by a vaccine are important parts of Covid19 disease management.

In some of the Western countries where large population is fully vaccinated, schools have been re-opened in phased manner; have started having safe indoor social gatherings without masks, slowly domestic travel from all modes have started, of course following Covid19 guidelines.

In the backdrop of all these developments, India had extraordinarily done well in containing the spread of first wave of Covid19. People started arguing that there was no need to get vaccinated; we have natural immunity and protected etc. Even a large part of medical fraternity did not get vaccinated. This complacency has put the country in a devastating condition of Covid19 medical emergency (due to 2nd wave during Feb-April, 2021) from shortages hospital beds, ventilators, medicines, and exhausted medical

staff, doctors, nurses and paramedics. Suddenly there has been acute shortage of medical oxygen too. The second wave, said to be mutant variant has turned out to be a super spreader. The number of people infected with mutant variant has crossed 3 lacs per day in a very short time, and the country is back to partial to full lockdowns in some states. Night curfews, compulsory facial masking and ban on social and religious congregations and more. Panic reaction all over, as they often say in cricket that India digs itself in to a hole and tries to come out with some rescue acts by the tail enders. Of course it is not a good analogy but life and death situation due to Covid19 super spreader mutant. The nation was devastated.

Suddenly there is a cry for universal vaccination for everyone above 18 years of age. 'Jabs for all' slogan was answered as phase-3 of vaccination will be rolled out from 1st May 2021. By now government has more data on safety and efficacy of both the vaccines in use

Jabs (jobs) for all! / 198

and also it has cleared permission to other vaccine candidates for emergency use in India. The scepticism and vaccine hesitancy has turned in to 'jabs for all!' leading shortage of vaccine doses. There is rush to get vaccinated which is good and may help to spread herd immunity soon.

Jobs for all can be achieved when we have **jabs for all**. In fact in certain parts of the country colleges and Universities will be opened by the end of July 2021 after all the faculty, staff and students are fully vaccinated. As of today (July 2021) nearly 40 crore people have been vaccinated with at least single dose. The fear of the 3rd wave has removed the vaccine hesitancy and there is rush for the jabs! In other words India can move back to growing economy in all sectors from education, agriculture, industry, trade, hospitality, and travel etc once its population is safe and free from Covid19 nuance. Once we are fully vaccinated, we can

start doing more, said medical experts and the government.

I slept and dreamed that life is all joy

I woke and saw life is all service

I served and saw that service is joy!

-Rabindranath Tagore

Post script:

Many of the foreign vaccines are either cleared or under regulatory scrutiny to be rolled out in the country. The Russian vaccine, Sputnik has been not only cleared for emergency use but nearly six pharmaceutical companies will be manufacturing it in the country. There are other 'Made in India' vaccines by Zydus Cadila and Biological Evans will be soon rolled out for emergency use. The medical infrastructures, hospital beds, and medical oxygen plants are being created on war footing to meet any Covid emergency in future.

21. Covid19-related terminologies

The Covid19 pandemic has introduced a number of words and phrases that convey information related to the pandemic. Understanding these new words and phrases may help to protect oneself from infection and decrease anxiety.

1. Asymptomatic: not showing any symptoms (signs of disease or illness). Some people without any symptoms still have and can spread the coronavirus. They are asymptomatic, but contagious. Fever, cough, and shortness of breath are the main symptoms of Covid-19

2. Antibody: antibody (immunoglobulin), is a large, Y-shaped protein used by the immune system to identify and neutralize foreign objects such as pathogenic bacteria and viruses. The antibody recognizes a unique molecule of the pathogen, called an antigen. Antibody is a protective protein produced by the immune system

in response to the presence of a foreign substance, called an antigen. Antibodies recognize and latch onto antigens in order to remove them from the body

3. Covid-19: coronavirus disease 2019; potentially a severe respiratory illness caused by coronavirus and characterized by fever, coughing, and shortness of breath

4. Contact tracing: identifying and monitoring individuals who may have had contact with an infectious person to control the spread of a communicable disease

5. Covidiot: someone who ignores public safety recommendations or Covid-appropriate behaviors

6. Fearodemic: fear + epidemic is a condition one experiences after the epidemic, particularly after the Covid19 infection. The symptoms included panic attacks, listlessness, sadness, anger, depression, family

Covid19-related terminologies / 202

arguments blaming each other for getting the infection
etc

7. Flattening of the curve: a parameter reflecting the rate at which people become infected with the novel corona virus.

8. Germaphobe: a person who has an irrational or disproportionate fear of germs and contamination

9. Herd immunity: When most of a population is immune to an infectious disease, this provides indirect protection-or population (large group) immunity (called herd immunity or herd protection)-to those who are not immune to the disease

10. Hunger game: purchasing all the supply of the drug or vaccine, ie; Covid-19 vaccines and Remdesivir

11. Incubation period: the length of time between when an infection begins and when there are apparent signs of the disease

12. Infodemic: a mix of two words, ‘information’ and ‘epidemic’ that typically refers to a rapid and far-reaching spread of both accurate and inaccurate information about something, such as a disease (pandemic)

13. ILI: influenza-like illness

14. Jab: an injection of a medicine or vaccine given through a needle to prevent the spread of a disease (flu jab or Corona jab)

15. Morbid: is a gloomy (depressing) state of an individual relating to a disease.

16. Morbidity rate: an indicator or measure of how many people have an illness relative to the population

17. Masks: masks are a simple barrier to help to prevent one's respiratory droplets from reaching others. Scientific studies have shown that masks reduce the spray of droplets when properly worn over the nose and mouth. Covid-19 spreads mainly from person to person through respiratory droplets. Respiratory droplets travel into the air when one coughs, sneezes, talks, shouts, or sings. These droplets can then land in the mouths or noses of other people who are nearby or people may breathe these droplets in

18. N95 masks: N is a Respirator Rating Letter Class. It stands for 'Non-Oil' meaning that if no oil-based particulates are present, then one can use the mask in the work environment. N95 filtering facepiece respirator (commonly abbreviated as N95 respirator) is

a particulate-filtering facepiece respirator that meets the requirements of the U.S. National Institute for Occupational Safety and Health. N95 classification filters at least 95% of airborne particles (95% efficiency). Some disposable N95 masks have an optional exhalation valve which helps to reduce exhalation resistance. It makes easier to breathe (exhale)

19. novel Coronavirus: *nCoV*

20. Oxygen concentrators: are medical devices used for oxygen therapy in patients who are unable to get enough oxygen into their bodies on their own. They deliver oxygen directly to the patient via a nasal cannula or oxygen mask. Unlike oxygen tanks or cylinders which contain a fixed amount of pressurized oxygen, the concentrators collect oxygen from the surrounding air, concentrate it, and then deliver it to the patient. They do not need refilling, and they will never

run out of oxygen. The air contains 78 per cent nitrogen and 21 per cent oxygen. Oxygen concentrators take the air, filter it through a sieve, release the nitrogen back into the air, and then concentrate the remaining oxygen. The oxygen that is concentrated in this device holds 90 to 95 per cent purity and it can easily be dispensed through a pressure valve that helps to regulate the flow to the nasal cannula at a rate of 1-10 litres per minute

21. Pandemic: a disease *outbreak* that spreads across countries or continents. It affects more people and takes more lives than an epidemic. Throughout the human history many pandemics have been reported such as smallpox, tuberculosis, plague, HIV/AIDS and influenza. The current one is Covid-19 (SARS-CoV-2) pandemic

22. Plasma therapy: also called convalescent plasma therapy which uses antibodies from patients who have completely recovered from Covid-19 infection. The

patients who have recovered from Covid-19 infection are asked to donate their blood so that the plasma component of the blood is separated which contains the antibodies against SARS-CoV-2 virus. The plasma containing antibodies is injected into an infected person's body. The blood sample of the donor is checked for any existing diseases such as Hepatitis B & C, including HIV. It is one of the medical procedures

23. PPE: personal protective equipment made of specialized clothing or other wearable gear that minimizes one's exposure to sources of illness or injury, and in medical contexts helps to inhibit the spread of infection to others

24. Quarantine: a period of time during which a person or animal that might have a disease is kept away from other people or animals so as to prevent the spread of the disease (mostly contagious)

25. Quarantini: a cocktail consumed in isolation

26. Remdesivir: is one of the antiviral drugs recommended for conditional use in treating SARS-CoV-2 viral (Covid19) infection in hospitalized patients. Remdesivir was originally developed (Gilead Sciences) to treat hepatitis C and Ebola viruses. Remdesivir is a nucleotide prodrug of an adenosine analog. It binds to the viral RNA-dependent RNA polymerase and inhibits viral replication through premature termination of RNA transcription

27. Social distance: a safe or appropriate distance or amount of space between two people or between people in a group. This is essentially to maintain a safe or appropriate distance from other people to slow the spread of a contagious illness or disease

28. SARS-CoV: severe acute respiratory syndrome-corona virus

29. Self-quarantine: to refrain from any contact with other individuals for a period of time (generally for 14 days)

31. Steroids: are hormones naturally produced in the human body. Steroids have many endocrine functions and influence many systems in the body. Many synthetic steroids are used in therapy of inflammation and other conditions, for example, corticosteroids, dexamethasone, prednisone, methylprednisolone, hydrocortisone and anabolic steroids etc. Steroids are effective in the treatment of seriously ill Covid-19 patients. *The WHO guidelines describe about their use in the treatment of patients with severe or critical Covid-19*

32. Virtual meeting(s): real-time interactions that take place over the Internet using integrated audio and video, chat tools, and application sharing. They offer a way to engage students in fully interactive, online

learning experiences such as lectures, discussions, and tutoring

33. Ventilator: a machine that supplies oxygen to a patient having severe lung issues as in case of Covid-19. A ventilator machine requires a specialist or respiratory therapist

34. WFH: work from home is a new mode of doing the work (job) remotely instead of going to work place like office. Many organizations transitioned their employees from the office to a work from home mode during the Covid19 pandemic

35. Zoonotic disease: a disease that exists in animals but can also infect (transmitted) humans. Ebola, swine flu, rabies and Covid-19 are zoonotic

36. Zoom (zooming): a popular video chat platform commonly used in videoconferencing, and communication, and ubiquitous

37. Zoom fatigue: it is an outcome of prolonged videoconferencing or chats, feeling exhausted or tired. Some of the symptoms include feeling of exhaustion, irritating eyes, emotionally drained out, and avoiding social interaction after the event. Social scientists are working out the scale to assess the degree of fatigue of zoom conferencing as this platform has become a popular mode of holding interviews, discussions, classroom teaching etc. Prolonged sessions are discouraged or people are advised to take breaks or move away from the screen

22. Evolution of new concept of preventive medicine practice

In mid 1970s the World Health Organization (WHO) developed a model list of Essential Medicines (EML) to help the member countries to achieve the goal of right to health. This was aimed at guiding the member countries to prepare their national formularies and policies for access, quality, and use of essential medicines. WHO defined **Essential Medicines** (EM) as those drugs (medicines) which are vital for the health needs of the majority of people in a country, region and institution, and therefore it has to be a national policy of the respective governments. Further, to qualify the drugs to be listed in EML, they have to be effective, safe, meet the medical need and above all economic (cost effective). In order to achieve this goal, respective governments have to constitute local committees to guide the preparation of the list. The local committees must consist of physicians, pharmacists and health

workers. The committees must accommodate a variety of local situations and requirements; complete information on medicines (generic and propriety names; single vs multiple combinations); quality assurance; storage conditions; supply and distribution channels and economic considerations (cost effectiveness).

The first WHO model list of essential medicines (about 220) was released in 1977. Many member countries adopted the EML and suitably modified it keeping the local needs. Government of India (GoI) took 20 more years to accept and adopt model list. The Ministry of Health and Family Welfare in consultation with the Drugs Controller General of India (DCGI) released its first list of EMs in 1997 which contained more than 300 medicines or formulations.

The selection of essential medicine is a continuous process. It should take into account changing priorities

Evolution of new concept of preventive medicine practice / 214

of public health, epidemiological conditions, and back-up information received from health workers. Further, the list should accompany concise, accurate and comprehensive information on essential medicines. It should meet the quality assurance requirements such as drug content, stability and bioavailability of the formulation (in-house testing, documentation from regulatory authority or manufacturers). It became imperative that health workers are to be educated and trained about essential medicines. Back-up research, both clinical and pharmaceutical to select a particular drug product under local conditions, the cost of medicine as well as the total cost of the therapy are to be considered while recommending the medicine. The WHO EML is only a **model list** which provided internationally recognizable set of selected medicines to help countries choose how to treat their priority health needs. Each governments has to establish, a 'National drug regulatory Authority' to ensure drug procurement in public and private sector, availability of

drugs in the formulation listed, proper storage and distribution of medicines. The success of the EML program depended upon the efficient administration of supply, storage and distribution at every point from the manufacturer to the end-user.

In 1986-87 academic sessions a new 3 semester PG programme was introduced. It was an opportunity for us to introduce the concept of EML in pharmacology teaching. Thus, EML became part of pharmacology syllabus. Subsequently we also briefly taught the EML concepts to our B. Pharma students under Clinical Pharmacology curriculum. Much before most of the state governments adopted the GoI approved EML we started teaching the concepts of EML to our students at Panjab University. A couple other developments happened in the 1990s as regards EML. National institutions like PGIMER and AIIMS adopted EML. The Panjab University also constituted medicines purchase committee and I was made one of the

Evolution of new concept of preventive medicine practice / 216

members. Though the University budget for the medicines was limited yet it was important we followed the practices of PGIMER. I suggested our purchase committee and the CMO about the medicines stalk audit and to follow the guidelines of the premier medical institute, PGIMER. By then I had given couple of popular talks on EML and briefly I addressed all the doctors of our University Health Centre. We adopted EML list of the PGIMER and implemented the practices. An audit of the limited stalk of medicines was carried out and a practice of purchasing medicines for each quarter (supply for 4 months) was implemented. In a small way a beginning was made

Around the time a non-governmental organization (NGO) called The Delhi Society for the Promotion of Rational Use of Drugs (DSPRUD) started functioning in close collaboration with the Delhi Government involving the Universities and Govt hospitals in the National Capital. The main objective of the DSPRUD

was essentially to implement various components of Rational Use of Drugs (RUD) policy. They prepared the first Essential Drugs List (EDL) for a centralized/pooled procurement system for Delhi administration run hospitals. In 1997, the Delhi Programme was designated as the INDIA-WHO Essential Drugs Programme by the WHO. It was supported by the WHO. I attended some of their training programmes and subsequently became one of the active members. As part of the RUD concept I proposed to carry out the 'prescription audit' at Panjab University Health Centre (PUHC). In the beginning doctors were not enthusiastic. We developed the protocol and shared with the doctors in our PUHC. Even though there was initial resistance from some, but we completed a small study of 6 months and shared the findings with the doctors. The programme was welcomed. The DSPRUD partly supported our research activities. This activity became part of our PG curriculum. We took permission from the University

Evolution of new concept of preventive medicine practice / 218

authorities and made it as part of M. Pharm first semester practical exercise. Students were keen to interact with the patients and the doctors. PG students spent nearly one semester of their practical time in carrying out prescription audit in PUHC and were made to submit their study report as the requirement. This practice was carried out for many years. We not only published our observations and this exercise in their curriculum made some of our post graduates to look for opportunities in Clinical pharmacy or Pharmacy practice as a career. It was a great satisfying moment for us.

Some times in 1980s I started looking at irrational drug combinations available in the market. At that time there were nearly 60,000 formulations available with tremendous variation in the price within the therapeutic category. Amongst them, there were several irrational combinations. One of the most glaring examples was the combination of diazepam (anti-anxiety drug) with

almost every category of formulation! I critically analyzed various therapeutic category reported in MIMS (Monthly Index of Medical Specialties) and published a report in a medical journal (1983). This study became prologue to my popular lectures on EML. Forty years later, even today nothing much has changed; I continue to add/update price variation information to my lecture.

India is a founder member of the International Solar Alliance with headquarters in the country. With about 300 clear and sunny days in a year none of us should suffer from vitamin D deficiency. But unfortunately one of the popular investigations and diagnosis these days is vitamin D deficiency. Recently, my wife and I were the subjects of such an ordeal. The investigation costs a bit and we were asked to take vitamin D (D3) in a typical regimen, i.e; once every day to start with and then once a week followed by once a month for a long time! When I went buy vitamin D supplements, it was a

Evolution of new concept of
preventive medicine practice / 220

shocker; monthly course varied from Rs 56 to Rs 150!
Vitamin preparations are out of the government price
control (DPCO) list of medicines.

The first WHO EML (1977) recommended around ten Fixed Dose Combinations (FDCs) considered to be rational and essential. The list included antitubercular, antimalarial, hormonal birth control pill, levodopa + carbidopa, and a few antibiotic combinations like trimethoprim + sulphamethoxazole (*Septtran*). But the Indian market is flooded with FDCs as if it is fancy to push the FDCs without any rational or evidence of clinical advantage and most importantly cost-effectiveness. In the 1990s I served on the Indian Pharmacopeia (originally known as Pharmacopeia of India, IP) Committee for two terms (nearly 10 years) as a pharmacologist and chairman of one of the important committees. IP committee was involved in the preparation of monographs for individual drugs, approval of new medicines to be included in the IP,

deleting some of the obsolete drugs and critically looking in to testing (analytical) procedures for individual drugs for their purity. Being a government publication, updating the contents of IP used to take several years. Earlier editions took nearly ten years for publication. The committee took a conscious decision to bring addendum on regular basis. In those days IP used to be a replica of British Pharmacopeia (BP) and some monographs had reference of United States Pharmacopeia (USP). The serious issue was that of analytical procedures prescribed in the IP which were not sensitive as compared to BP or USP as many procedures involved the use of sophisticated analytical instruments which Indian industry could not afford to procure. Most of the Pharmacopeias did not have monographs on FDCs. With time bioavailability and bioequivalence studies became essential requirements for approval of FDCs.

Evolution of new concept of preventive medicine practice / 222

The WHO EM list is not just intended for low-income countries. It is considered to set global standard of model list of medicines for all. Ever since the first list in 1977 nearly 34 member countries have prepared their own EMLs and use it as guideline for public procurement. Therefore, it is important to ensure that the EML is updated to reflect contemporary worldwide medical practice. Expert Committee of the WHO meets regularly every two years to update the Model List, using a transparent process. Any entity may propose an addition; individuals, governments, pharmaceutical companies, or medical associations. But they must provide evidence of the proposed drug's safety, efficacy and cost-effectiveness. They also need to show that the medicine is both essential to meeting priority healthcare needs and is available in adequate amounts. Over the years (it is more than 40 years since the first EML in 1977) changes to the list have reflected evolving public health challenges.

In 2007 World Health Assembly observed that WHO EML did not contain essential medicines for children. Subsequently WHO launched an initiative called ‘make medicines child size’ and published the first WHO model list of Essential Medicines for Children (EMLc). Similarly, the global community was witnessing an alarming onslaught of non-communicable diseases which are also called lifestyle diseases. These included diabetes, cardiovascular diseases (CVD) such as hypertension, stroke and sudden heart attack, COPD, depression etc. These diseases once considered as diseases of the developed world, are taking heavy toll in the developing countries. Due to sedentary lifestyle and bad eating habits; India is a victim of diabetes and silent heart attacks. In 2012, the WHO announced its goal of reducing the number of premature deaths (<70 years) due to non-communicable chronic diseases by 25% by the year 2025. This was aimed at preventing myocardial infarction and stroke in most susceptible individuals. The ‘**polypill**’ concept of using FDC

Evolution of new concept of preventive medicine practice / 224

(comprising statins, blood-pressure lowering drugs and aspirin) therapy in persons with atherosclerotic CVD and in all other adults above 55 years of age showed a reduction in 33% incidences and overall 80% or more disease burden. However, in spite of the supporting evidence for a **pharmacological intervention** at an early stage, it was not initiated or practiced. There were arguments and counter arguments of using medicines without any clinical evidences. WHO recommended this approach as a "best buy" and polypill as a preventive approach to save or avoid millions of premature deaths and related morbidity globally from CVD at low cost.

In 2016, the WHO and the Center for Disease Control in USA, with support from the World Heart Federation (WHF) launched the Global Hearts initiative to support countries in scaling up CVD prevention and control by increased access to essential medicines and new technologies. Further, the WHF Roadmap for

secondary prevention of CVD outlines strategies for overcoming barriers to availability, affordability, and adherence to essential medicines for the prevention and control of CVD. The CVD expert group proposed **polypill** containing aspirin, beta-blocker, diuretic, statins, and ACE-inhibitors to be included in the WHO EM list as a preventive approach for secondary prevention of cardiovascular diseases. India is one of the developing countries badly affected by silent heart attacks and losing young adults in their productive years. Polypill or polycap FDCs are available in many countries including in India. But its (polypill) use is yet to be implemented for more than reasons. The concept and affordability are debated.

Essential medicines, as defined by the WHO, are those required to meet the priority health care needs of a population. Essential medicines are chosen with consideration for disease prevalence, efficacy and safety of the drug and cost-effectiveness. Essential

Evolution of new concept of preventive medicine practice / 226

medicines are used for disease prevention, treatment and control and are applicable to most chronic and acute diseases, thus, they are required to manage the global burden of treatable and preventable disease.

WHO charter for essential medicines: Access to essential medicines is part of the right to health. According to the Universal declaration of Human Rights the right to health is one of the fundamental rights of every human being irrespective of race, religion and political belief, economic or social condition. Therefore, access to essential medicines is well-founded in international law. The WHO Action Programme on Essential Drugs (Medicines) indicates the principles of accessibility, availability, appropriateness and assured quality to goods and service (the authoritative General Comment 14, 2000). The strategic plan of WHO (2008-2013) considered access to medical products and technologies (which included access to essential medicines) as progress

indicator. The policy indicators included: access for all people to necessary medicines, prices which society and the individual can afford, priority for drugs which meet the real health needs of the majority of the population, fair distribution between cities and rural areas, assurance that drugs are safe, effective and of good quality, adequate training of all prescribers, access to objective information, real dialogue between patient and prescriber, empowerment of consumers through education and information, community involvement and participation, development of medicines that meet health needs in the third world and not only those of rich countries, responsible manufacture and export, ethical promotion and marketing and a stop to “donations” of hazardous or ineffective products, respectively.

About the book

It has been nearly two years that the world is experiencing a global health crisis. The corona virus disease (Covid19) outbreak has hit the society at its core, loss of thousands of human life, loss of livelihood for millions of people, no schools and colleges, dwindling economy not seen before in the last one hundred years. The author looks at some of these and related contemporary issues in the present book, 'Collection of essays'. He also addresses some of the professional issues and developments. His writings are candid and absorbing. Like his earlier works the book is easy read and recommended for readers of all ages.



**ASSOCIATION OF PHARMACEUTICAL
TEACHERS OF INDIA (APTI)**

H.Q. : Bengaluru Secretariat / Communication Address

KLE College of Pharmacy,

2nd Block, Rajajingar, Bangalore - 560 010, Karnataka

Mob : +91 90088 88415

Email : aptienquiry@gmail.com