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Chief Editor
Rev. Dr. Dominic Savio, S.J.

St. Xavier's College (Autonomous)
30 Mother Teresa Sarani, Kolkata-700016
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A Multidisciplinary Journal

"Research is to see what everybody else has seen and think what nobody has thought."

- Albert Szent-Gyorgyi

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Double Blind Peer Reviewed Multidisciplinary Journal

The Principal
St. Xavier's College (Autonomous), Kolkata
30 Mother Teresa Sarani
Kolkata-700016

Message from Chief Editor

It gives me immense pleasure in forwarding the 13th volume of "**Aviskaar: A Xaverian Journal of Research**" for the year 2021 despite various challenges that we faced due to pandemic. This multidisciplinary journal has been successfully published each year since 2009 and this year is not an exception. It bears testimony to the research culture prevailing in our institution. Aviskaar journal fosters research interest among the faculties of Arts, Science and Commerce of our college. Our students, under the guidance of our faculty members have also actively participated in this research endeavour.

I am happy to note that present volume of Aviskaar journal has contributions from the Department of Biotechnology, Microbiology, Physics, Economics, History, and English of our college. The contributions are not only limited to the boundary of our college. This volume also includes contributions from Vidyasagar College, Brainware University, The Bhopal School of Social Sciences.

I would like to thank all the authors for their contribution. I am also thankful to the panel of reviewers for their valuable comments. Finally, I want to congratulate the editorial board to publish this journal successfully in time.

It is noteworthy that research environment of this institution is significantly improving. I strongly believe that this research culture will continue to grow and there will be many more meaningful contributions from all the departments of our college as well as from outside the college in the near future.

"Coming together is a beginning, staying together is progress, and working together is success".

I hope all our faculty members will contribute to enrich and uplift the quality of the journal.

May God bless you all!

Nihil Ultra.

Rev. Dr. Dominic Savio, S.J.

Message from Managing Editor

It is indeed my proud privilege to forward the 13th volume of Aviskaar: A Xaverian Journal of Research, this time there has been lot of modification and we have followed the UGC norms strictly. Under the dynamic leadership of our principal Rev. Dr. Dominic Savio S.J., we have constituted a new research committee comprising of experts from the different domains of Arts, Science, Commerce and Management, which is in line with the UGC norms. The plagiarism check has been done stringently in order to balance the quality of the journal. The contribution from students is indeed a remarkable aspect, this also speaks about the standard of our students and it will give them an opportunity to think rationally and carry forward the research career in future.

This year the COVID -19 pandemic situation has changed our life style to a great extent, we got habituated to virtual class, for almost a year the students have not attended the physical classes and the campus is running in virtual platform, but even in this condition the volume has been completed successfully and it would not have been possible without the active help of the reviewers and the rigorous exercise carried out by Dr. Tapalina Bhattasali, who not only maintained a perfect coordination between the contributors and the reviewers but also successfully edited the volume. Any word of appreciation is inadequate for her.

Aviskaar provides the quality research platform, where faculties from various departments of our college and researchers from various domains can share their ideas and work together. Professors can also convert projects supervised by them into research papers. It will enhance confidence of our students and also help us to show the excellent academic works carried out by our students. I strongly believe that with more and more post graduate departments added to our college, the research culture will take off from this point.

"One finger cannot lift a pebble". "When there is a teamwork and collaboration, wonderful things can be achieved."

Dr. Arup Kumar Mitra

Message from Associate Editor

First of All, I would like to thank God for giving us the scope to publish 13th volume of Aviskaar: A Xaverian Journal of Research amidst of this pandemic situation. Our principal Rev. Dr. Dominic Savio, S.J. always encourages new ideas and contemporary research. I would like to convey my sincere gratitude to Fr. Principal for his kind support. I am also grateful to Prof. Dr. Arup Kumar Mitra for his guidance. Today, I am here only because of them.

I am thankful to all the members of the editorial board. In a special way, I would like to thank Dr. Ayan Chandra for his valuable suggestions. On behalf of the editorial board, I would like to convey our heartfelt thanks to the internal reviewers, who help us a lot despite their busy schedules. We are also thankful to the external reviewers for their expert opinion.

The first paper of this volume presents a brief study of neurological impact of COVID-19 and its effect on pediatric population. Second paper outlines about cold atmospheric plasma to treat medical conditions. Third paper presents analytical experiment on adsorption of ions under different preparative precursors. Fourth paper focuses on a policy analysis of E-Vehicle industry in India. Fifth paper illustrates the analytical study to find out the relation between job security and work life balance with anxiety for females in education sector during pandemic. Sixth paper presents various trends of interpreting medical literature in the context of Colonial Bengal. Seventh paper narrates history of Social Work education in India. Eighth paper depicts on evaluation of E-Sports. Ninth paper presents a study of immigration experience in the inheritance of loss and Americanah.

Aviskaar believes in double-blind peer-review process to avoid any type of biasness. It seeks quality contribution from all over the world. *"Many ideas grow better when transplanted into another mind than the one that they sprung up".* Aviskaar also encourages inter-disciplinary and trans-disciplinary research work.

I firmly believe that "Aviskaar" can show the true research spirit of Xaverian family to the outer world in the near future. If we are together, nothing is impossible.

Let us hope for the best.

Dr. Tapalina Bhattasali

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NEUROLOGICAL IMPACT OF COVID-19 AND ITS EFFECT ON PEDIATRIC POPULATION: A COMPREHENSIVE REVIEW

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ABSTRACT

The emergence of a novel strain of ß-coronavirus in Wuhanin early December 2019, signaled what were to be the most harrowing months for humanity in recent memory. Studies relating to the epidemiology and pathophysiology of the SARS-CoV-2 virus, the causative pathogen for the present COVID-19 pandemic, revealed that the viral coat carried a spike protein specific to the angiotensin-converting enzyme 2 (ACE2)-receptors found on type II pneumocytes located within the alveoli of human lungs. Victims of the pathogen primarily demonstrated pneumonia-like symptoms and a fatal cytokine storm, the combination of which leads to acute respiratory distress syndrome (ARDS) and systemic inflammatory response syndrome (SIRS). However, as the disease began to spread, a multitude of varied symptoms was brought to the fore, one of the most significant being the effect of the disease on the brain of the patient. Besides, there is a widespread debate about the effect of the virus on the pediatric population. Hence, the purpose of the current Review is to present a consolidation of the various facts related to the neuropathophysiology of the disease, some well-established and some relatively new, along with a comprehensive detailing of the effect of the disease on the pediatric population.

Keywords. *brain, ß-coronavirus, COVID-19, novel strain, pandemic, pediatric population, SARS-CoV-2 virus*

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1. INTRODUCTORY INFORMATION ON SARS-COV-2 AND COVID-19 DISEASE

1.1 Taxonomic Classification of SARS-CoV-2

In the nomenclature of COVID-19, 'CO' stands for corona, 'VI' for virus and 'D' for the disease and was first identified in December 2019. Earlier, the pathogen of this pandemic was referred to as '2019 novel coronavirus' ('2019-nCoV'). However, The International Committee on Taxonomy of Viruses (ICTV) announced "severe acute respiratory syndrome

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coronavirus 2 (SARS-CoV-2)" as the name of this new virus on 11th February 2020 [1]. The Coronaviruses are enveloped, positive-sense RNA viruses belonging to the sub-family Coronavirinae, family Coronaviridae and order Nidovirales [2,3]. SARS-CoV-2 belongs to ß-CoV of group 2B[4].

1.2 Epidemiology of COVID-19 Disease

Epidemiologically, the outbreak of COVID-19 clearly began at the South China Wholesale Sea Food Market in Wuhan, the capital city of Hubei Province in the People's Republic of China. Since then, a number of environmental samples from around the live animal section of the market were found to be positive for SARS-CoV-2 [2]. However, whether the strain itself originated from the market is still debatable, and under the scanner.

1.3 Generalized Symptoms of COVID-19 Disease

SARS-CoV-2 targets primarily the human respiratory system. Even though the primary manifestations of the disease are pneumonia-like symptoms and a heightened immune response termed 'cytokine storm', due to the later a variety of pathophysiological effects have been found to surface. The main symptoms are severe pneumonia (with CT-SCAN revealing the presence of ground-glass opacity nodules and woolly patches in the lungs), detectable serum SARS-CoV-2 viral load (RNAaemia) and acute respiratory distress syndrome (ARDS), along with systemic inflammatory response syndrome (SIRS). Besides these primary symptoms, reports of various dermatological, neurological, and gastrointestinal manifestations have also been analyzed. One of the most worrying aspect is the effect that the disease seems to have on the human brain[5,6].High blood levels of cytokines and chemokines predominate in patients with COVID-19 infection. These include IL1-β, IL1RA, IL7, IL8, IL9, IL10, basic FGF2, GCSF, GMCSF, IFNγ, IP10, MCP1, MIP1α, MIP1β, PDGFB, TNFα and VEGFA. Critically ill patients admitted to the intensive care units(ICUs) of hospitals are usually found to display very high levels of pro-inflammatory cytokines including IL2, IL7, IL10, GCSF, IP10, MCP1, MIP1α and TNFα. All these together are believed to play a part in the disease symphony, complementing the more severe effects of the disease, including death[7–11].

2. IMPACT OF COVID-19 ON THE BRAIN

2.1 Sites of Infection in the Human Nervous System

As the pandemic has progressed, two of the most disturbing symptoms that have surfaced are the neurological and neuropsychiatric effects of the disease. The viral RNA has been successfully identified and isolated from the cerebrospinal fluid (CSF) [5,12]. This establishes the virus as possessing neuroinvasive properties, with the capability to infect the human central nervous system (CNS) including brain, and peripheral nervous system (PNS).

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It has also been noticed that the angiotensin-converting enzyme 2 (ACE2) is present on non-neuronal cells in the cerebral vasculature [13].

2.2 Neuroinvasion of SARS-CoV-2

The virus may enter the CNS by utilizing the vasculature, nerve structure, CSF or the lymphatic system [14–16]. The presence of various types of non-neuronal cells in the olfactory epithelium, as well as on the epithelial cells of the cerebral vasculature which express ACE2 receptor may act as a facilitator for the multiplication, accumulation and entry point of the SARS-CoV-2 virus [17,18]. It may be so that the virus can enter trans-neuronally via the olfactory nerve, approaching the brain across the cribriform plate [19]. This could be the pathophysiological reason behind the loss of smell reported by various patients recently. Since 'nose-to-brain' route is used for medicine delivery, this pathway could very well act as the pathway for brain infection by the virus [20,21]. Post-mortem (PM) studies have also demonstrated the presence of the virus in neural and capillary endothelial cells of the frontal lobe of the brain [22]. It also seems that co-morbidities like diabetes and hypertension enhance the expression of ACE2 in the brain and promote neurotropism [23]. The circulation of the viral particles in the blood stream, leading to their interaction with the capillary endothelium and subsequent destruction, could provide a basis for the access of the viral particles to the brain. This may be a cause for brain hemorrhage long before the lethal effects of the neuronal damage manifest [24]. These changes may be complicated by the ARDS-related hypoxic conditions. In fact, it may so happen that the condition of the patient worsens due to infection of the pneumotaxic center in the brainstem following the viral invasion [6,25].

2.3 Direct Effects of COVID-19 on the Brain

The major neurological symptoms of COVID-19 include headache, myalgia and malaise. It affects the complete neural axis, including the cerebral vasculature. The major complications implicated in this disease include meningitis, encephalopathy, meningoencephalitis, ischemic stroke, acute necrotizing encephalitis and Guillain-Barre Syndrome [25]. Reports from Wuhan and China mention various neurological symptoms including headache, vomiting, acute cerebrovascular diseases, consciousness impairment, and skeletal muscle dystrophy [8,26].

2.3.1 Headache

COVID-19 related systemic viral infection may be a cause for acute headache, resulting from primary cough-headache and tension-type headache. Headaches, centered around the 7^{th} to 9^{th} day of the illness, may be contributed to the cytokine storm [27]. Meta-analysis and systematic review have revealed the incidence of headaches to be prevalent around in 10-15% of the patients [28–31].

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2.3.2 Encephalopathy

Altered sensorium has been implicated with an increased risk of death in COVID-19 patients [32]. Hypoxia and systemic inflammation may result in delirium, with symptoms ranging from confusion to stupor to coma [33]. Psychosis with hallucination was one of the first reported instances of neurological implications of the disease. Auditory and visual hallucinations accompany persecutory delusions and Capgras delusion, with complex systematized delusional misperceptions [34].

2.3.3 Encephalitis

The first case of viral encephalitis arising as a symptom of COVID-19 along with isolation of the virus from the CSF was first reported in China [35]. Magnetic Resonance Imaging (MRI) scan of patients harboring the virus have implicated the limbic system, but otherwise normal scan of the brain [36–44]. Various studies have also revealed the presence of disseminated encephalomyelitis and immune-mediated acute hemorrhagic necrotizing encephalopathy. In the later, hemorrhagic lesions are diagnosed in the thalamus [45–47]. It has also been proposed that the respiratory distress is being precipitated by an additional or solitary medullary respiratory center dysfunction. This is based on the observation that patients lacked dyspnea, but had marked tachypnea and tachycardia [6,48].

2.3.4 Coagulopathies

The occurrence of disseminated intravascular coagulation (DIC) is well documented in severe COVID-19 infections, characterized by an increased D-dimer (a small protein fragment present in the blood after a blood clot is degraded by fibrinolysis), prolonged prothrombin time and mild thrombocytopenia, but without hypofibrinogenemia [49,50]. Coagulopathies increase the chances of ischemic stroke and other prothrombic events in patients suffering from COVID-19 infections [51–53].

2.3.5 Ischemic Stroke

Coagulopathies associated with COVID-19 increase the risk of ischemic stroke in patients presenting with the disease. In a particular study, it was noted that 11 out of 221 patients suffered from ischemic stroke. There were two isolated cases of cerebral hemorrhage and cerebral venous thrombosis. The patient population presenting with stroke symptoms had advanced age, and many had associated co-morbidities [54]. In a different study on 6 patients with large cerebral infarcts, high D-dimer levels (≥1000 μg/L) were noted [55]. Young (<50 or, specifically between 33-49 years of age) population also showed a predisposition to COVID-19 related strokes. The National Institute of Health stroke scale scores, on hospitalization, ranged from 13 to 19 [56,57]. A proposed mechanism for COVID-19-related strokes is vascular endothelial dysfunction and coagulopathy.

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2.4 Indirect Effects of COVID-19 on the Brain

The down regulation of the ACE2 receptors as a result of the disease hampers blood pressure regulation, increasing the chances of cerebral vascular complications [58].The development of SIRS is a prevalent syndrome linked to viral infections like COVID-19. Also, virus-mediated oxidative stress arising from acute inflammation-mediated early release of pro-inflammatory cytokines may sometimes not be compensated by the antioxidants present in the system. This may increase the systemic oxidative stress, to which the brain is susceptible as it is a metabolizer of oxygen with no antioxidant mechanism [59].It has been established that the brain-lung-brain axis is interconnected, and neurological dysfunction along with injury may be related to acute respiratory distress [60]. It is well known that SARS-CoV-2 is a potent cause for cytokine storm, and resultant apoptosis and cell death arising from a marked inflammatory and immune response [10]. SARS-CoV-2 patients have elevated levels of IL-1β, IFN-γ, IP-10, MCP-1, IL-4 and IL-10 [7,9]. An excited immune system could be the cause of enhanced vascular hyperpermeability, coagulopathies and multiorgan failure, along with neural degeneration [61]. Inflammatory damage to the Blood Brain Barrier (BBB) has been observed to be the reason behind various neurodegenerative and CNS infections. The presence of elevated levels of pro-inflammatory cytokines such as TNF-α and IL-6 is strongly correlated with neuro- inflammatory signaling [62]. Also, imbalances in the redox state pave the way for severe tissue damage and neuronal degeneration [63–65]. Hypoxia caused by the infection of the alveoli, resulting in impaired gas exchanges, increases anaerobic metabolism in the mitochondria of brain cells [66,67]. This may promote vasodilation, accompanied by the swelling of blood cells, interstitial edema, cerebral blood flow obstruction, ischemia and congestion [68].

3. IMPACT OF COVID-19 ON PEDIATRIC POPULATION

3.1 Epidemiology and Transmission

A preliminary observation and literature survey reveals the fact that neonates and children develop a milder form of COVID-19 [69–78]. The incidence of the disease in different countries are low and variable (China: 2-12.3%, Italy: 1.2%, Korea: 4.8%, USA: 5%) [69,72,79–81]. In India, age-specific COVID-19 incidence increase sharply in both settings - between the 5-17 year, and 18-29 year age groups [82]. It appears that even though children between 0-18 years of age are prone to the disease, neonates are the most vulnerable [69,83]. In the age groups, the proportion of severity of the disease dropped with increasing age. Age group <1 years had 10.5% severe case load, 1-5 years age group had 7.3%, 6-10 years had 4.2%, 11-15 years 4.1% and >16 years age group 3% [69]. Presently available literature fortunately points that there is a decreased risk of vertical (maternal-fetal) transmission. The virus has also not been isolated from amniotic fluid, umbilical cord blood and breast milk to date [74,78,84–89]. However, both symptomatic and asymptomatic carriers could transmit the virus [90–95]. The best reported cause behind transmission were infected cases as a part

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of a family cluster [76,83,96,97]. A proposed reason behind this is early imposition of lockdown conditions on schools in the current pandemic situation, and the absence of high propensity of international travel among children or travel in general [98].

A large-scale analysis of 72314 cases from China also supports this trend. Among the cases, there were 419 (0.9% of all cases) in Children 0-9 years old and 549 (1.2%) in children aged 10-19 years. There was no fatality in 0-9 year age group, while 1 individual died in the age group 10-19 [99].

3.2 Increased Rate of RT-PCR False Negative Tests in Children

Increasing evidence is pouring in from various studies of an innate immune response very strong in pediatric population against SARS-CoV-2 to show that the viral replication is shut down even before it can replicate enough to reach the threshold level for a positive result in a RT-PCR test for COVID-19.

Analysis of antibody raised in 3 children of under 10, whose parents contracted the disease, demonstrated the presence of antibodies specific for SARS-CoV-2. However, even after repeating RT-PCR tests 11 times over 28 days none of the children tested positive despite being in close contact with their parents [100].

The same result was observed even in children who developed the rare, but severe complications of multisystem inflammatory syndrome in response to SARS-CoV-2 infections. The rate of positive RT-PCR tests ranged from 29% to 50% [101–103].

A possible reason behind this may be hidden in the type of antibodies which are raised in children, as compared to adults. A study encompassing 32 adults and 47 children under the age of 18 revealed that antibodies in children were primarily aimed against SARS-CoV-2 spike glycoprotein (S). In adults, along with this antibody, there are antibodies against SARS-CoV-2 nucleocapsid proteins which are essential for viral replication. The presence of such antibodies is indicative of widespread viraemia. Hence, the lack of nucleocapsid-specific antibodies suggest the absence of widespread virus infections in children [104].

3.3 Possible Reasons Behind Low Transmission of Infections in Pediatric Population

Even though no straightforward answer is available yet, but one may survey literature and come to on an evidence-based conclusion of what might be the possible reasons why children in general fair better when infected by the SARS-CoV-2 virus.

One such identifiable cause is the down regulated expression of ACE2 receptors in their noses, thus reducing the probable host cell entry points. In a study statistically analyzing the expression of the said receptor distribution in population, based on age grouping, it was observed that ACE2 gene expression was the lowest (mean log2 counts per million, 2.40;

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95% CI, 2.07-2.72) in younger children. The study analyzed 305 individuals between ages 4 and 60, of which 45 belonged to this category. The values of expression increased with age, with mean log2 counts per million of 2.77 (95% CI, 2.64-2.90) for older children (n = 185), 3.02 (95% CI, 2.78-3.26) for young adults (n = 46), and 3.09 (95% CI, 2.83-3.35) for adults (n = 29). However, in order to establish this as a determined trend, more diverse and population-wide studies are required [105].

An assay for SARS-CoV-2 S-reactive antibodies demonstrated the presence of such antibodies in SARS-CoV-2 uninfected individuals. These were particularly abundant in children and adolescents. These antibodies were primarily targeted against S2 subunit of the Spike protein. The uninfected donor sera carried specific neutralizing activity against SARS-CoV-2 and its pseudo types. The marked absence of IgM and IgA antibodies was suggestive of cross-reactive immunological memory [106].

In a study to examine the presence of such antibodies, 48 young uninfected healthy donors (sampled between 2011 and 2018; aged 1-16 years) were identified. 21 individuals had detectable SARS-CoV-2 S-reactive IgG antibodies. In contrast, out of 43 young adults (aged 17-25), only one individual had it. The presence of SARS-CoV-2 S-reactive IgG antibodies attained a value of 62% between the age of 6 and 16. This correlated well with an increase in the HCoV (Human Coronavirus, non-SERS and MERS types) seroconversion in this age group. The value was significantly higher than in adults ($P<0.00001$, Fisher's exact test) [106–109].

The presence of antibodies often does not impede pathogenesis. However, an assay of the neutralizing capacity of the majority of sera from SARS-CoV-2 uninfected donors containing flow-cytometry-detectable cross-reactive antibodies did demonstrate neutralization of authentic SARS-CoV-2 infection of Vero-E6 cells [106].

Therefore, prior HCoV infection may be a putative reason for the age distribution of susceptibility to COVID-19, which has so far demonstrated an inability to cause widespread disease in children. However, such antibodies are widespread in adults, which indicate some additional requirement such as random B cell receptor repertoire or focusing on frequency of HCoV infection rather than the time since last infection. The frequency of HCoV infection is biased towards children and adolescents [108–111] .

An aspect which requires further analysis as a factor affecting pathogenesis of SARS-CoV-2 in pediatric population is the nature of T cells involved. It has been suggested that relative naivety of T-cells in pediatric population might make them more efficient in their response to the virus. This topic is severely debated with multiple studies proposing otherwise and has not found footing as a major determinant of pathogenesis in the pediatric population [112,113].

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3.4 Symptoms

It has been observed that the median time of incubation of the virus in children is longer than in adults. Clinical manifestations of the disease in children include fever and respiratory symptoms like cough, sore throat, pharyngeal erythema, nasal congestion, tachypnea/dyspnea, and tachycardia [114–116]. Gastrointestinal symptoms are also common, and include abdominal cramps, nausea, vomiting and diarrhea [72,85,90,117,118]. Neurological manifestations are luckily rare [116,118–121]. Analysis of 66 children spanning 12 different studies revealed that the patients maintained normal leucocyte count, but has elevated C-reactive proteins (CRPs) and procalcitonin by 13.6% and 10.6% respectively [122–124]. The prevalence of hyperinflammatory state, with features similar to atypical Kawasaki disease, was also reported [125,126]. New evidences indicate complications leading to Multisystem Inflammatory Syndrome in children (MIS-C), as well as Kawasaki's Disease [127]. Radiological findings are variable in the pediatric population, with several presenting with interstitial pneumonia and CT-Scan showing opacities of high density [72]. Ground glass opacities which are common in adults are fortunately reported lesser in children [72]. Time lapse between hospitalization and the onset of clinical symptomsis found to be 2 days, while recovery time is between 1-2 weeks [90–95].

Data relating to importance of comorbidity as a precipitating factor for increased severity of COVID-19 disease presentation is sparse. However studies do exist, and reveal that there is a high probability of experiencing severe symptoms when COVID-19 is conjugated with co-morbidities in children. Obesity has been identified as one of the most important factors in this case. In 42 different studies encompassing 275661 children without co-morbidities and 9353 with co-morbidities, severe COVID-19 was present in 481 (5.1%) children with co-morbidities and 579 (0.2%) children without co-morbidities. A relative risk ratio was obtained on the basis of random-effects analysis which was 1.79 (95% CI 1.27 – 2.51; $I2$ = 94%). Children with obesity has a relative risk ratio of 2.87 (95% CI 1.16 – 7.07; $I2$ = 36%). In this analysis of children presenting with severe COVID-19, 64 children were obese, 58 presented with chronic respiratory disease, 45 had cardiovascular disease, 33 had neurological conditions, 26 had immune disorders, 19 had metabolic diseases and additionally 12 had hematological disorders. These were the primary identified co-morbidities, along with 11 cases of cancer [128].

However, good news is that most identified cases in the pediatric population carry mild clinical manifestation. Most cases carry a good prognosis and recover within 1-2 weeks of disease onset [76].

4. CONCLUSION

It is thus quite evident from published literature that the viral disease COVID-19 has profound neurological effects which are independent of disease severity. Multiple symptoms

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manifest and are hidden from primary analysis. It is only now, when the world is slowly reviving itself, that these symptoms and their long-term effects are becoming more apparent.

These symptoms themselves are not to be taken lightly, and careful analyses have identified unique neurological manifestations of the disease. The apparent direct impact might overshadow the indirect effects of the disease on the brain. However, in a disease well characterized by a cytokine storm, the brain cannot go amiss, and various studies have verified this through analyses of the physical manifestations of the effects on the brain. However, more research and statistical analyses of large populations are required to correctly establish the true scale and impact of the neurological symptoms of this viral disease.

The extent of the disease in the pediatric population was initially assumed to be mild, and that view continues to be supported by varies population-based studies. The reasons behind such a bias are yet to be scientifically analyzed and identified. The logical reasoning of facts and data has already indicated possible explanations of this. Future research prospects lie in the analyses of the importance of the innate immune response in children against SARS-CoV-2. The established fact of the lack of expression of ACE2 receptors on nasal epithelium also needs to be revisited through diverse population-wide studies. It would be only logical to assume the importance of prior HCoV infections in raising cross-reactive antibodies which offer possible immunity against COVID-19. However, the assumption that this is a result of higher frequency of HCoV infections in children needs to be carefully studied to ascertain the exclusive truth. It may be so that some mechanisms that are still hidden from scientific glance might be responsible for the same.

The decreased efficiency of transmission in children due to social distancing, absence of physical interaction in educational institutions and absence of mobility might also have helped in containing transmission among children, and the spread of the disease in the pediatric population. More data and further research is required to ascertain the effect of such precautions that might have helped in dampening the effect of the crisis in the pediatric population.

So, as we head further into the changed world in this new-normal era, it is only advisable to take proper precautions against this disease and the ‘invisible’ virus, about which we still do not know much.

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COLD ATMOSPHERIC PLASMA: A NOVEL WAY TO TREAT MEDICAL CONDITIONS

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ABSTRACT

Cold atmospheric plasma (CAP) is a near room temperature ionized gas. It is an innovative upcoming method used in the medical sector. CAP consists of a highly reactive mixture of ions, electrons, reactive molecules, excited species, electric fields and UV radiation. CAP is used to disinfect inanimate surfaces and prevents biofilm associated Candida infections and helps prevent community acquired nosocomial infections in health care settings. Pathogens such as Salmonella can form chemical resistant biofilms. CAP can effectively tackle this issue by 99.3%. It is a contact free, water less method that shows promise as a possible tool for rapid disinfection of materials associated with food processing. CAP finds use in dentistry. It can effectively treat, dental caries, intra oral diseases and can disinfect root canals, dental surfaces. It is useful in adhesive restorations and in tooth whitening. To date, CAP treatment has demonstrated significant anti-cancer capacity over 20 cancer types in vitro. Notable among these cancer cell lines are brain, skin, breast, colorectal, lung, head and neck cancers. In vivo studies have shown successful CAP mediated treatment for subcutaneous Xenograft tumours and Melanoma in mice. CAP can be generated by both direct and in direct discharges. Two types of CAP devices in use are based on this principle. Plasma jet and DBD (Di electric barrier discharge) and SMD (Surface micro discharge) are most popular. CAP has its own advantages and limitations. Safety of the equipment needs to be taken care of. The cost of equipment, maintenance and marketing are some of the issues at present.

Keywords. *CAP, DBD, SMD, Plasmajet, Melanoma*

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1. INTRODUCTION

There are four fundamental states of matter i.e solid, liquid, gas and plasma. Plasma is a neutral ionized gas that is composed of positively charged ions, electrons and neutral particles. As matter transforms from solid to liquid and from liquid to gas a rise in temperature takes place [1]. In certain cases, the atmospheric plasma discharge is very rapid. This leads to the creation of another category of plasma where electrons and heavy particles remain in thermal non equilibrium. This is COLD PLASMA (CAP). The heavy particle temperature of CAP ranges from 25 degrees to 45 degrees. CAP finds use in Biomedicine.

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Several species such as Oxygen based radicals and Nitrogen based radicals are generated in CAP [2, 5].

1.1 CAP Devices

CAP is normally generated by direct or by in direct discharge mechanism.

Based on these principles, CAP devices are:

- Di electric barrier discharge (DBD)
- Plasma jet, Plasma pen, Plasma gun, Plasma pencil or needle.
- Surface micro discharge (SMD)
- Cold plasma stimulated solutions (PSA) or Cold plasma activated medium (PAM)[3,4]

1.2 Gases Employed to Generate CAP

- HELIUM
- ARGON
- NITROGEN
- HELIOX (mixture of Helium and Oxygen)
- AIR

CAP has emerged as an innovative upcoming method for use in the medical sector. CAP consists of a highly reactive mixture of ions, electrons, reactive molecules, excited species electric fields and Ultraviolet radiation [5]. It is widely used for the disinfection of fomites and keeps in check bio film associated pathogen infections. It also helps prevent community acquired and nosocomial infections in health care settings.

1.3 Use of CAP to Aid Quick De Contamination of Food Contact Surfaces Infested with Salmonella Biofilms

Cross contamination of food items stemming from persistent pathogen reservoirs is a huge risk factor in the processing environment. CAP is endowed with the unique ability to in activate Salmonella biofilms. It has been reported that a 15 S treatment with CAP could effectively reduce Salmonella bio films by 2.13 log CFu/ ml (i. e by about 99.3 %). It is contact free, water less method that does not require a sanitizer. CAP has the potential to act as a possible tool for rapid disinfection of materials associated with food processing [5, 6].

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2 USE OF CAP IN DENTISTRY

CAP makes possible, a novel, painless method to prepare cavities for restoration with enhanced longevity [7,8]. It is capable of bacterial inactivation and non-inflammatory tissue modification. CAP treats dental caries and helps in composite restoration of tooth. It also finds use in teeth whitening. Plasma needles inserted in dental cavities can kill e. coli and Streptococcus mutans. Further, CAP is efficacious in treating intra-oral diseases, aids root canal dis infection, cleanses dental surfaces and helps in adhesive restorations [9,10].

2.1 Inactivation of Candida Albicans Infested Bio Films by CAP

Candida albicans, a fungus often grows as a bio film on almost all surfaces such as medical devices and human epithelial cells. Skin as well as superficial mucosal infections are largely attributed to this fungal group [11, 12]. It is known that Candida shows strong resistance to conventional broad spectrum anti-fungal drugs such as Amphotericin B and Fluconazole [13, 14]. CAP has emerged as a viable anti-microbial strategy to kill microbes growing on bio films. It has been reported that SMD plasma could effectively in activate Candida bio films growing on inert surfaces by 99.9% [15]. CAP could prevent both community acquired and nosocomial infections in health care settings [10, 11].

2.2 Other Uses of CAP

CAP finds use in other medical applications such as wound healing, blood coagulation, anti-bacterial treatment, endothelial cell proliferation etc. CAP plays a pivotal role in Cancer treatment [16].

3. ROLE OF CAP IN CANCER THERAPY

In vitro and in vivo studies on the action of CAP on cancer cells have been performed [16,17]. Studies indicate that the mechanism of action of cold plasma on cancer cells appear to be related to the generation of reactive oxygen species (ROS) with possible induction of the apoptosis pathway. Further it has been observed that cancer cells are more sensitive to the effects of CAP because a greater percentage of cells are in the S phase of the cell cycle [18].

4. CLINICAL APPLICATION OF CAP IN ONCOLOGY

Studies carried out in laboratories have shown that cancer cells are more sensitive to CAP treatment than normal cells. This has been attributed to ROS, expression of aquaporins and the overall cholesterol composition of the membrane [19]. Basic cellular responses such as apoptosis, growth inhibition, selective cancer cell death, cell cycle arrest, DNA and mitochondrial damage and immunogenic cell death have been demonstrated following CAP treatment [20, 21]. It is a well-known fact that plasma is capable of inducing apoptosis in cancer cells resistant to conventional chemotherapy and can therefore be used in combination

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with other treatments to obtain synergistic and complimentary action [22]. CAP treatment has demonstrated significant anti-cancer capacity over 20 cancer types in vitro [20]. Notable among these cancer cell lines are brain cancer, skin cancer, breast, Colorectal, lung, head and neck cancers [24]. In vivo studies have demonstrated successful CAP mediated treatment for sub cutaneous Xenograft tumours and Melanoma in mice [25].

5. ADVANTAGES OF CAP IN CANCER THERAPY

One main advantage is the potential selectivity towards cancer cells. This is a vital parameter in the current era of targeted therapy. It is known that the treatment of tumours, particularly solid tumours by anti-cancer drugs faces three impediments.

- Treatment specificity
- Cancer cell resistance
- Treatment penetration

Owing to the unique physical and chemical properties of CAP, it could possibly serve as a multi modal therapeutic tool that could offer an answer to these issues [26]. CAP possibly operates through mechanisms involving P53, NF- KB, JNK or caspase pathways [27]. The use of Plasma induced chemical species and electric fields make possible an interesting tool for optimizing drug delivery. Brain and CNS cancers showed resistance to chemotherapy, radiotherapy and surgery. CAP proved highly successful in these areas [27]. In vitro studies showed significant reduction in tumour size and an Overall increase in the rates of survival. In vivo interactions were mostly performed on sub cutaneous tumour xenografts in mice [28, 29].

6. CAP INDUCES IMMUNOGENIC CELL DEATH

Tumours frequently evade surveillance of the immune system through immunosuppessive strategies [30]. CAP could elicit immunogenic cell death. It stimulates the recruitment of macrophages and cytotoxic T cells [30]. CAP is known to promote adaptive immunity in vitro against Melanoma cells. No resistance to CAP has been reported till date.

7. CAP RESTORED SENSITIVITY OF CHEMO RESISTANT CANCER CELLS TO SPECIFIC DRUGS

- CAP restored TEMOZOLAMIDE (TMZ) resistant glioblastoma cells to TMZ therapy.
- It made possible, the tumour necrosis factor related apoptosis inducing ligand (TRAIL) resistant colorectal cells sensitive to TRAIL treatment [27, 28, 32].

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8. ACTION OF CAP AND NANO PARTICLE TECHNOLOGY TO TREAT CANCER

- CAP has made possible stronger anti-cancer activity through synergistic application with nano-particle technology [29].
- Enhanced anti-melanoma effect was achieved using CAP to treat melanoma cancer cells pre-treated with anti –Fak antibody conjugated gold nanoparticles [31,33].
- Combined treatment with PEG- coated gold nanoparticles and CAP increased cancer cell death in solid tumours [32].
- In CAP treated cancer cells, migration rate was decreased, and detachment rate increased [32].

9. SUMMARY OF CAP TREATMENT IN ONCOLOGY

CAP has shown promise as a selective anti-cancer tool. However, there is a need for the development of standardized reliable protocols for all future clinical trials. Studies are underway to develop more efficient type of plasma for each type of cancer. One of the future directions in the field of anti-cancer potential of CAP is in its action on dysplastic cells, mainly extensive lesions in critical areas where surgery would be either impossible or else way too expensive.

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ANALYSIS OF ADSORPTION OF IONS UNDER DIFFERENT PREPARATIVE PRECURSORS

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ABSTRACT

*A smart alternative to conventional crystalline silicon and existing thin film solar cells are CZTS thin film cells. CZTS stands for Copper-Zinc-Tin-Sulphide (**Cu_2ZnSnS_4**). Since all its ingredients are abundantly available on Earth and the synthesis process is simple, it is much easier and cheaper to manufacture than conventional solar cells. In this report we tried to prepare CZTS thin films on regular glass slides using SILAR (Successive Ionic Layer Adsorption and Reaction) method to study the amount of deposition of ions when the ingredients of the precursor solutions are varied.*

Keywords. *SILAR, CZTS, SEM-EDX*

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1. INTRODUCTION

At present the whole world is using energy at the rate of approximately 4.27×10^{27} J/year. This is equivalent to a power consumption of 15 terawatts (TW). This huge energy demand is primarily satisfied by fossil fuels, which are almost depleted. Of the possible sources of renewable energy, Solar Energy perhaps has the most potential. This is because of the sheer size of the solar energy resource when compared to wind, wave, or tidal power. Thin film solar cells made of CdTe and CIGS are being commercially used. Unfortunately, Cadmium is toxic, and Indium and Tellurium are scarce. Copper-Zinc-Tin-Sulphide (CZTS) on the other hand uses materials that are abundant and are non-toxic. Being a quaternary compound, its methods of synthesis are complicated and expensive. In this report we have studied the SILAR method of synthesis which is cost effective and can be performed at ambient conditions.

2. PROCEDURE

The ***SILAR (Successive Ionic Layer Adsorption and Reaction)*** method involves dipping the substrate, silica glass slide in this case, into the cation and anion solutions separately and

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washing it in distilled water in between. This process is repeated any number of times for a smooth coating of the material on the substrate. The details of the process are given below.

2.1 Steps of SILAR

The step-by-step procedure to obtain the CZTS coating at ***room temperature*** on the glass slide is as follows [1][2]:

- Dipped in beakers containing ***cationic solution for 30 seconds***
- Rinsed in ***distilled water for 10 seconds***
- Dipped in the ***anionic solution for 30 seconds***
- Rinsing in ***distilled water for another 10 seconds***

The whole cycle is repeated ***40-50 times*** to get a ***dark-brownish, greenish-black*** or ***brownish-yellow coating*** of thin film CZTS on the glass substrate depending on the reacting agents. Sometimes an effect called ***competitive adsorption*** comes into play, which we encountered while performing the experiment. It is the phenomenon that prioritizes adsorption of one ion over the other; more specifically the preferential adsorption of Sn^{2+} ions over Zn^{2+} ions, which gave an erroneous result in the percentage composition of elements on the thin film. This problem is tackled by using the ***Modified SILAR Sequence*** which has a separate cationic solution bath **consisting** of Zn^{2+} ions.

3 EXPERIMENT AND RESULTS

3.1 Sample 1

Cationic Solution: $CuSO_4$, $ZnCl_2$, $SnCl_2$, ***pH:*** 1.5;

Anionic Solution: Na_2S, ***pH :***> 11.5

Number of Cycles: 30

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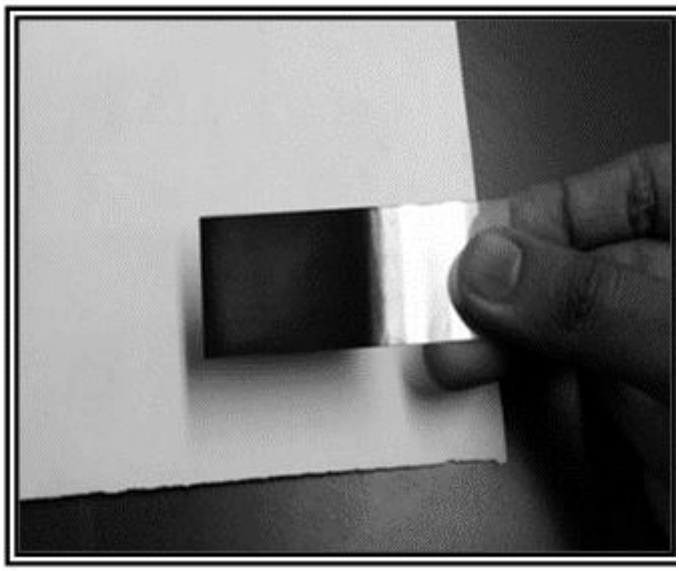

Fig. 1 Dark-Brownish Thin Flim

High resolution ***Image*** obtained from the ***Scanning Electron Microscope*** is shown below:

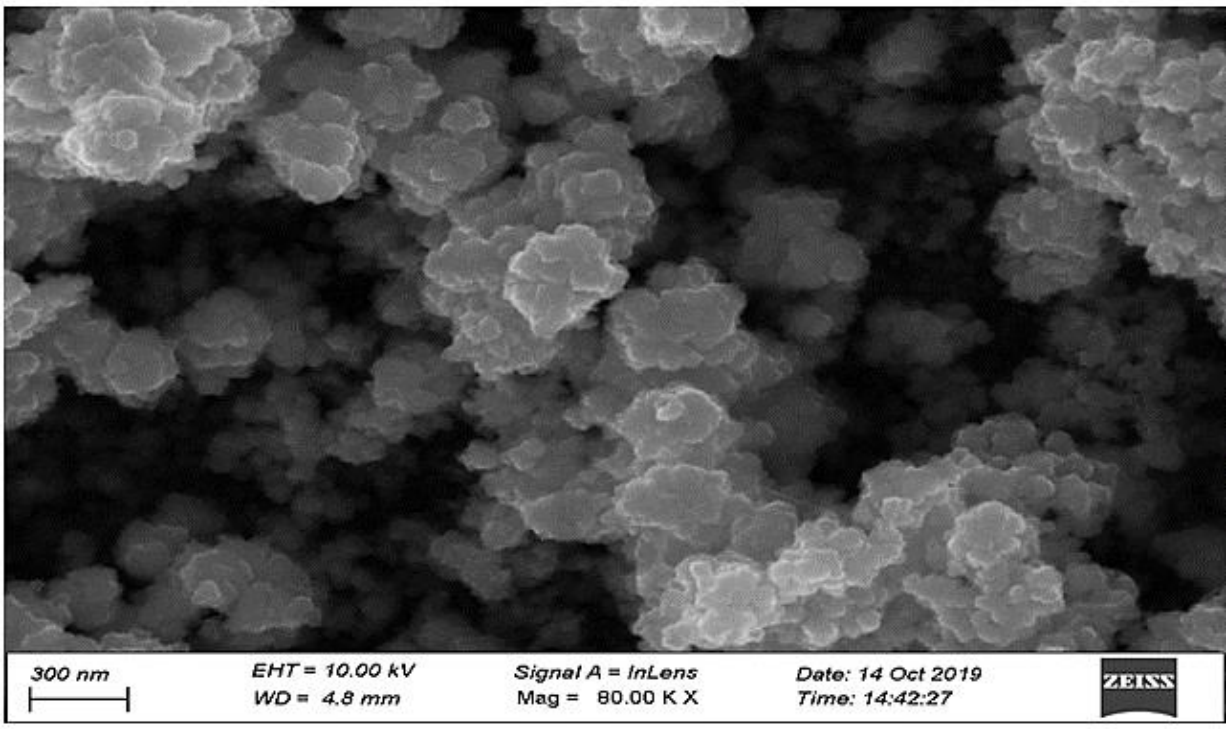

Fig. 2 Magnification- 80.00 KX

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Table 1. Percentage Composition of Different Elements for Sample 1

Element	App Conc.	Intensity Corr.	Weight %	Weight % σ	Atomic%
S	9.36	0.8558	15.40	0.13	30.46
Cu	36.68	0.9830	52.52	0.24	52.41
Sn	19.11	0.8385	32.08	0.22	17.14
Total			100.00		

3.2 Sample 2

Cationic Solution: $CuSO_4$, $ZnCl_2$, $SnCl_2$, ***pH:*** 1.5

Anionic Solution: C_2H_5NS, ***pH :***> 5.5

Number of Cycles: 25

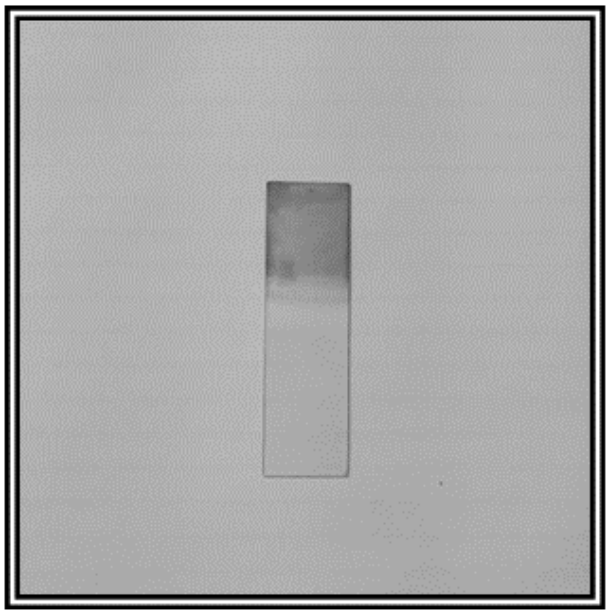

Fig. 3 Brownish-Yellow Thin film

High resolution ***Image*** obtained from the ***Scanning Electron Microscope*** is ***given below.***

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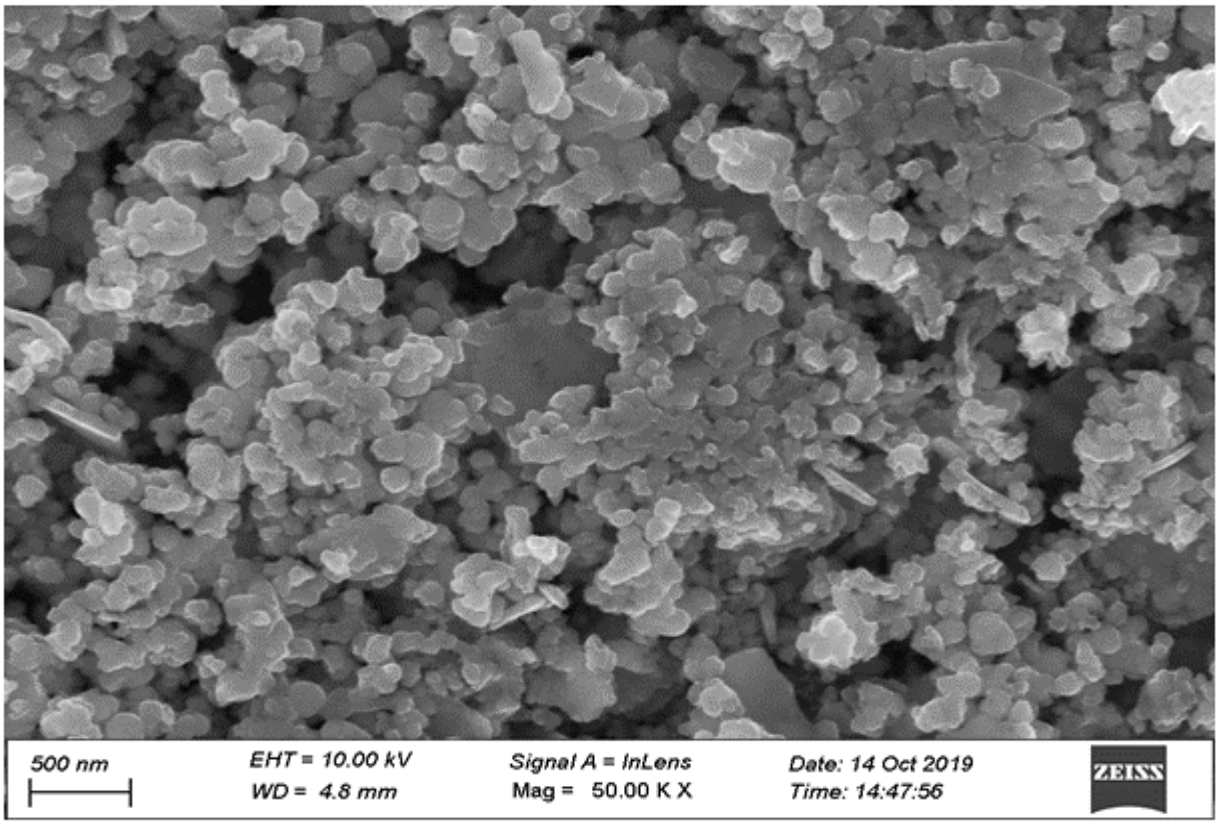

Fig 4: Magnification-50.00 KX

Table 2. Percentage Composition of Different Elements

Element	App Conc.	Intensity Corr.	Weight %	Weight % σ	Atomic%
S	2.64	0.9748	7.16	0.15	21.57
Cu	1.60	1.0334	4.09	0.28	6.21
Sn	31.99	0.9520	88.75	0.30	72.21
Total			100.00		

3.3 Sample 3

Cationic Solution: $CuSO_4$, $ZnCl_2$, $SnCl_2$, ***pH:*** 3.0

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Anionic Solution: Na_2S, ***pH :***> 11.5

Number of Cycles: 40

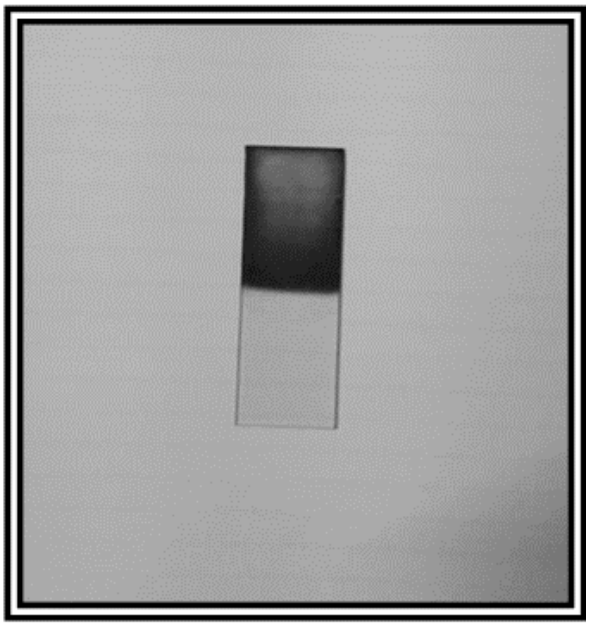

Fig. 5 Dark-Brownish Thin film

The high-resolution ***Image*** obtained from the ***Scanning Electron Microscope*** is ***given below:***

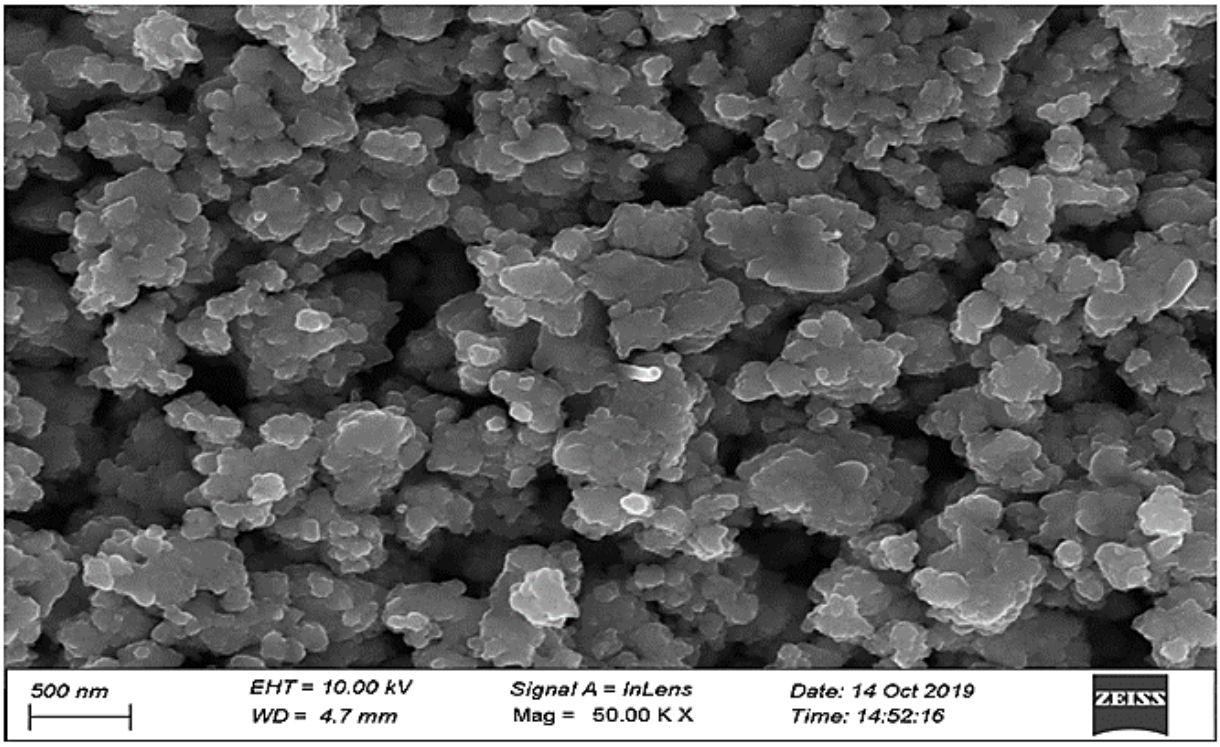

Fig 6 Magnification- 50.00 KX

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Table 3. Percentage Composition of Different Elements

Element	App Conc.	Intensity Corr.	Weight %	Weight % σ	Atomic%
S	10.99	0.8661	15.94	0.13	31.86
Cu	37.96	0.9836	48.49	0.24	48.92
Sn	23.83	0.8416	35.57	0.22	19.21
Total			100.00		

3.4 For the following samples the Modified SILAR method as mentioned earlier was used and the sample was then annealed in a sulphurized atmosphere

3.4.1 Sample 4

Cationic Solution: $CuSO_4$, $ZnCl_2$, $SnCl_2$, ***pH:*** 1.5

Anionic Solution: Na_2S, ***pH :***> 11.5

Number of Cycles: 50

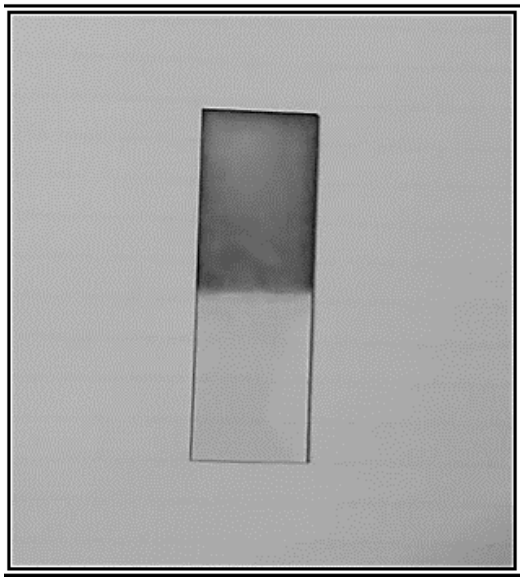

Fig. 7 Brownish-White Thin Film

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3.4.2 Sample 5

Cationic Solution: $CuCl_2$, $ZnCl_2$, $SnCl_2$, ***pH:*** 1.5

Anionic Solution: Na_2S, ***pH :***> 11.5

Number of Cycles: 50

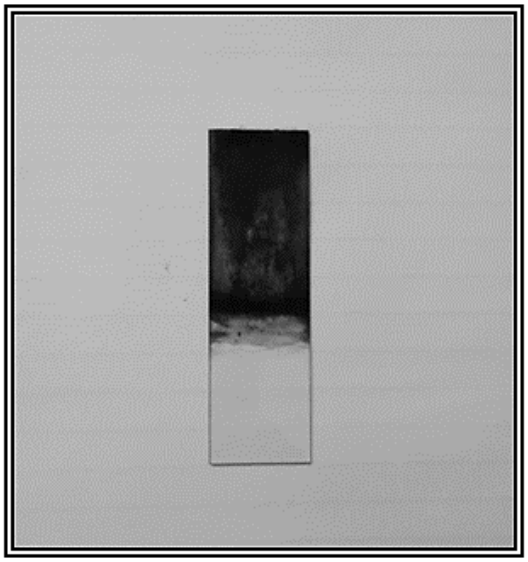

Fig. 8 Greenish-Black Thin Film

Due to some unfortunate circumstances (Covid19), ***SEM-EDX*** analysis ***could not*** be performed on Samples 4 and 5. As a result the percentage composition of elements adsorbed on these is still a speculation. However, we aspire to get the analysis results done as soon as the opportunity presents itself to us.

4 INFERENCE

- Zinc is absent in the samples 1, 2, 3. The probable cause for this might be ***competitive adsorption*** which prioritizes Cu^{2+} and Sn^{2+} ions over Zn^{2+} ions. This shortcoming was dealt with by using the ***Modified SILAR sequence*** approach.

- Tin was found to have a ***huge percentage*** of 72.21% presence for Sample 2 where we had used Thioacetamide as the anionic solution. This might be because of the low pH of the anionic solution.

- Copper ***dominated*** in presence when the base used was Sodium Sulfide, having percentages of 52.41 and 48.92 respectively in Samples 1 and 3.

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- There are indications of certain ***peaks being omitted*** from the EDX analysis, due to very low intensities. These peaks might be those of Zinc, which appear marginally in the CZTS thin film.

- Changing the pH from 1.5 to 3.0 saw the ***decrease*** in percentage of Cu deposited by 3.49% and ***increase*** in Sn and Su deposition by 2.07% and 1.40% respectively.

- The pH-dependence remains inconclusive as the percentage changes are small and fall within the domain of experimental inaccuracy and error.

5 CONCLUSION

The COVID-19 outbreak of 2020 has doused most of the plans this year due to institutions and labs all across the nation being shutdown to avoid risking contamination. During future opportunities, we intend to make sure that no peaks are omitted in the SEM-EDX analysis and Zinc is investigated in addition to Copper, Tin and Sulphur. We also hope to study the pH-dependence of deposition amounts of the elements in a more robust manner with more samples and a broader range of pH, as the main hurdle in this endeavour is the inability to examine all the samples because SEM-EDX analysis is expensive and in very high demand by the entire experimental science community.

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#First three authors have equal contribution to this work.

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THE E-VEHICLE INDUSTRY IN INDIA: A POLICY ANALYSIS

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ABSTRACT

Given the need for environmental sustainability, it is important for the Indian governments; central and state, to work on establishing the industry for electric vehicles. Currently, to meet set targets, subsidies and fee concessions to investors and purchasers are largely being relied on. However, policymakers need to analyse further the supply and demand side variables that would lead to an active market. This paper overviews the situation in India for industry layout and demand along with the current constraints on the government. It then provides a game theoretic framework for the EV market, showing how a desired equilibrium can be strategically achieved. It further provides a contrast with China's case and the impacts of an EV shift.

Keywords: *electric vehicle, ICE vehicle, infrastructure, environmental stability, strategy*

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1. INTRODUCTION

Vehicular emissions have been at the forefront of environmental issues and make countries bear heavy costs due to health impacts, climatic offsets and subsequent impacts on economic activity. India, being the second most populous country in the world, incurs major costs and faces high risks of worsening pollution in the future. It is the third largest emitter of greenhouse gases in the world. 87% of India's CO2 equivalent emissions of the transport sector come from road transport. Still, India has roughly 11 cars per 1000 people, compared to 403 cars per 1000 people in the United States [1]. This lower proportion implies that the need for sustaining economic growth makes it unfeasible for most states of India to curb vehicular activity. Hence, the shift to Electric Vehicles becomes particularly necessary. Electric car deployment has been growing rapidly over the past ten years, with the global stock of electric passenger cars passing 5 million in 2018, an increase of 63% from the previous year [2]. In FY2019, total EV sales in India were over 7, 50,000 and reached a total of 7, 59,600 units. This includes electric two-wheelers (1, 26,000), electric three-wheelers (6, 30,000) and electric passenger vehicles (3,600), which implied electric two-wheelers witnessing growth of 130 percent year-on-year. Despite this, India has less than 1% of the Electric four wheelers' share globally. The required progress in the EV market to deal with

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pollution is therefore much greater. Both the Central and several state governments have realized the importance of a shift in the country from Internal Combustion Engine Vehicles to Electricity Powered Vehicles or Electric Vehicles (EVs). Several governments have set targets of achieving goals of complete and partial transition to Electric Vehicles in the public and private transport sector [3]. Measures largely consist of subsidizing purchases for consumers and improving the "ease of doing business" for potential firms by reducing charges for set-up. Tax concessions and smoothening of the registration processes have been initiated by several state governments. Moreover, ease in land procurement has also been highlighted. The Union Budget of 2019 incorporated major tax breaks for Lithium ion and other manufacturing plants [4] to boost the supply-side.

However, it is important to note other crucial factors that determine the participation of firms and generation of demand. If the business environment, with respect to these other factors, is not conducive enough, then the current government policies will not be successful in causing market growth.

2. INDUSTRY LAY-OUT

2.1 Lithium-Ion Battery Production

It has been largely established that a sizeable market for Electric Vehicles, especially as a replacement for ICE vehicles, requires large scale production of the key components of these products. Here, it is identified that the lithium-ion batteries that are the best alternative for EVs currently must be made easily accessible in the EV industry in India which makes the plans for internal production of vital importance.

2.2 Production Aims

India has committed to cutting its GHG emissions intensity by 33% to 35% percent below 2005 levels by 2030. India proposes to add 175 GW of renewable energy capacity by 2020 and to achieve 40 percent of its electricity generation from non-fossil sources by the same year [4]. It is given that each GWh (1,000-megawatt hour) of battery capacity is sufficient to power 1 million homes for an hour and around 30,000 electric cars [4]. It is highly desirable for this policy objective of the government to be achieved. For the same, plans involve the set-up of Giga factories for lithium-ion batteries in the country similar to those in the United States. It is necessary to analyse the intricacies in setting up such a plant.

2.3 Production Giga-plants: Tesla Comparison

For analysing the nature of investment in production, we consider the case of the establishment of the Giga plants emulating those of Tesla Inc. in Nevada, United States, which the Indian Government has decided upon. The Tesla Giga plant 1 is a venture carried out by three companies with their own divisions performing their own functions; Panasonic

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generating the battery cells and H&T manufacturing cell cans. Panasonic is the exclusive cell provider for Tesla and converts raw materials such as refined lithium and steel into the cells Tesla uses to create a Model 3 battery. Using a combination of human and robot labour, Tesla assembles the cells into long rows Lister calls "bandoliers," because of the way the cells are arranged around a cooling tube. The tubes are also manufactured on-site by the company Valeo [5].

Qualified Project Name:	Gigafactory Project	
Participant:	Tesla, Inc. (FKA: Tesla Motors, Inc.)	
Reporting Period:	October 1, 2017 - December 31, 2017	
Project to Date Period:	October 17, 2014 - December 31, 2017	

	Reporting Period	Project to Date Period
Real Property		
Land	$ -	$ 41,989,595
Building/Structure	$ 22,991,171	$ 353,027,436
Building/Structure - CIP	$ 123,368,558	$ 1,232,222,395
Subtotal	$ 146,359,729	$ 1,627,239,426
Personal Property		
3- year life	$ 101,545	$ 1,069,639
5- year life	$ -	$ 14,384
7- year life	$ -	$ -
10- year life	$ -	$ -
15- year life	$ 3,208,327	$ 55,514,134
20- year life	$ -	$ -
30- year life	$ -	$ -
CIP - Life TBD	$ 116,168,388	$ 637,110,751
Other Property	$ -	$ 351,371
Expensed Property	$ 10,767,315	$ 29,734,810
Subtotal	$ 130,245,575	$ 723,795,089
Total Capital Investment	$ 276,605,304	$ 2,351,034,515

Fig. 1(a) Tesla Plant

Source: https://electrek.co/2018/08/21/tesla-gigafactory-1-3000-workers/

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Required Qualified Employee Audit Data

Qualified Project Name:	**Gigafactory Project**
Participant:	**H&T Nevada, LLC**
Reporting Period:	**October 1, 2017 - December 31, 2017**
Project to Date Period:	**October 17, 2014 - December 31, 2017**

Workforce Composition	**Reporting Period**	**Project to Date Period**
Number of New Qualified Employees (NQE)	**27**	**93**
Number of NQEs who are Nevada Residents	**20**	**72**
Residency as a Percent		**77%**
Average Wage of Qualified Employees		**$ 33.26**

Fig. 1(b) Tesla Plant

Source: https://electrek.co/2018/08/21/tesla-gigafactory-1-3000-workers/

Qualified Project Name:	**Gigafactory Project**
Participant:	**Panasonic Energy Corporation of North America**
Reporting Period:	**October 1, 2017 - December 31, 2017**
Project to Date Period:	**October 17, 2014 - December 31, 2017**

Workforce Composition	**Reporting Period**	**Project to Date Period**
Number of New Qualified Employees (NQE)	**486**	**1,201**
Number of NQEs who are Nevada Residents	**473**	**1,182**
Residency as a Percent		**98%**
Average Wage of Qualified Employees		**$ 28.41**

Fig. 2(a) Panasonic Plant

Source: https://electrek.co/2018/08/21/tesla-gigafactory-1-3000-workers/

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Qualified Project Name:	Gigafactory Project
Participant:	Panasonic Energy Corporation of North America
Reporting Period:	October 1, 2017 - December 31, 2017
Project to Date Period:	October 17, 2014 - December 31, 2017

	Reporting Period	Project to Date Period
Real Property		
Land	$ -	$ -
Building/Structure	$ -	$ -
Building/Structure - CIP	$ -	$ -
Subtotal	$ -	$ -
Personal Property		
3- year life	$ 35,562	$ 8,269,412
5- year life	$ -	$ -
7- year life	$ 27,972,458	$ 223,733,713
10- year life	$ -	$ -
15- year life	$ 17,695,037	$ 58,419,440
20- year life	$ -	$ -
30- year life	$ -	$ -
CIP - Life TBD	$ 125,652,352	$ 1,003,132,668
Other Property	$ -	$ -
Expensed Property	$ 505,101	$ 1,409,789
Subtotal	$ 171,860,510	$ 1,294,965,022
Total Capital Investment	$ 171,860,510	$ 1,294,965,022

Fig. 2(b) Panasonic Plant

Source: https://electrek.co/2018/08/21/tesla-gigafactory-1-3000-workers/

Qualified Project Name:	Gigafactory Project
Participant:	Panasonic Energy Corporation of North America
Reporting Period:	October 1, 2017 - December 31, 2017
Project to Date Period:	October 17, 2014 - December 31, 2017

Workforce Composition	Reporting Period	Project to Date Period
Number of New Qualified Employees (NQE)	486	1,201
Number of NQEs who are Nevada Residents	473	1,182
Residency as a Percent		98%
Average Wage of Qualified Employees		$ 28.41

Fig. 3(a) H &T Plant

Source: https://electrek.co/2018/08/21/tesla-gigafactory-1-3000-workers/

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Qualified Project Name:	**Gigafactory Project**
Participant:	**H&T Nevada, LLC**
Reporting Period:	**October 1, 2017 - December 31, 2017**
Project to Date Period:	**October 17, 2014 - December 31, 2017**

	Reporting Period	Project to Date Period
Real Property		
Land	$ -	$ -
Building/Structure	$ -	$ -
Building/Structure - CIP	$ -	$ -
Subtotal	$ -	$ -
Personal Property		
3- year life	$ 20,234	$ 122,334
5- year life	$ 31,940	$ 195,153
7- year life	$ -	$ -
10- year life	$ 5,206,154	$ 20,740,859
15- year life	$ -	$ -
20- year life	$ -	$ -
30- year life	$ -	$ -
CIP - Life TBD	$ 5,941,836	$ 56,727,876
Other Property	$ -	$ -
Expensed Property	$ -	$ -
Subtotal	$ 11,200,164	$ 77,786,222
Total Capital Investment	$ 11,200,164	$ 77,786,222

Fig. 3(b) H &T Plant

Source: https://electrek.co/2018/08/21/tesla-gigafactory-1-3000-workers/

The technological equipment used at the plant is not of a nature that is available in India, nor is the quality of Research and Development. Hence, there shall be need for heavy import of capital and knowledge requirements for the same purpose. The Indian Government has indicated an investment of $4 billion for this project while the cumulative value of the Tesla Giga factory 1 has been $5 billion [6]. Assuming here that the Government shall be generating private investment in this project worth over a billion dollars provides us a higher valued project in India; it is essential for the Indian plant to have higher aggregate investment as the availability of robotic and other highly advanced equipment as well as set-up infrastructure is understandably of a lower standard than that afforded by Tesla and Panasonic in the United States. What can be reasonably inferred is that the government will incur heavy short-term expenditure for this project.

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2.4 Tax Benefits: Nevada Comparison

The U.S. state of Nevada offered Tesla Inc. tax incentives worth $1.3 billion for building their facility. Alongside this, 20-year sales tax abatement worth approximately $725 million and property and business-tax abatements around $332 million and $195 million in transferable tax credits were also provided [7]. In this regard, the tax incentives offered by the Central Government of India, state governments and/or both have to exceed that provided in the former case as both the risk and cost of carrying out the same kind of project in India are higher than in the United States. So far, GoI is expected to offer 3% foreign exchange hedge on overseas loans and a fixed 3% interest subvention on loans availed in Indian rupees. In addition, a reduction in minimum alternative tax (MAT) may be offered [8]. These come alongside the reduction in Customs Duty to manufacture electric cells in India in 2021-2030, tax rebates up to Rs 1.5 lakh and total exemptions up to Rs 2.5 lakh and GST rate cuts on electric vehicles from 12% to 5% [6]. The comparison shows that tax incentives are required to be much larger in this context for successful implementation.

2.5 Local Employment Generation

Actual data provided by Tesla for June 30, 2018 shows 7,059 employees, which is 9 percent above projected employment levels for 2018. The count of qualified employees, as at June 30, 2018 was 4,247 [9]. Qualified employees are permanently employed individuals while unqualified are those who have not served a consecutive three-month term. The state government declared that the electric-car maker's factory would add 4 percent to the gross domestic product of Nevada, where unemployment is 7.7 percent, the nation's third highest. The cost of labour in India is relatively lower than in the U.S. due to lack of skill and large supply. Hence, the wages offered shall also be marginally lower here. I expect that to imply higher marginal product of labour which shall lead to greater employment for optimising the plant's activity. I estimate the employment generation in the Indian state to be higher; at around 7,500. Labour substitution shall prove necessary in the relative absence of robotic technology. The high costs of availing said technology shall reduce its real marginal benefit although the efficiency in the case of greater labour usage shall be lower than when advanced equipment is used.

2.6 Foreign Collaborations

Tesla and China's Contemporary Amperex Technology Co. Ltd (CATL) are among the companies that have shown an initial interest in the Indian government's plan to build large factories to make lithium-ion batteries at an investment of about ₹50,000 crore. BYD Co. Ltd and Panasonic among others has shown interest in the same [6, 8]. It is feasible for India to take up projects as joint ventures with foreign collaborators at the Central as well as State level.

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2.7 Lithium Resources

For successful functioning of the plants, an adequate supply of lithium carbonate and other requisite materials is extremely necessary. This is largely unavailable in India which is why there must be established trade connections for imports. Joint venture firms of the government are searching for the same. This is in the backdrop of Chinese state-owned firms securing lithium mine concessions in countries such as Bolivia, Argentina and Chile, which forms the so-called lithium triangle [6]. With Chinese acquisitions of lithium mines and concessions from countries not just in Latin America but also in Africa and other parts of the world have threatened the supply considerations for India in the EV manufacturing sector, especially as China is the most important rival in the market. Currently, 40% of EVs in India are imported from China; a reliance that must be rid of [8].

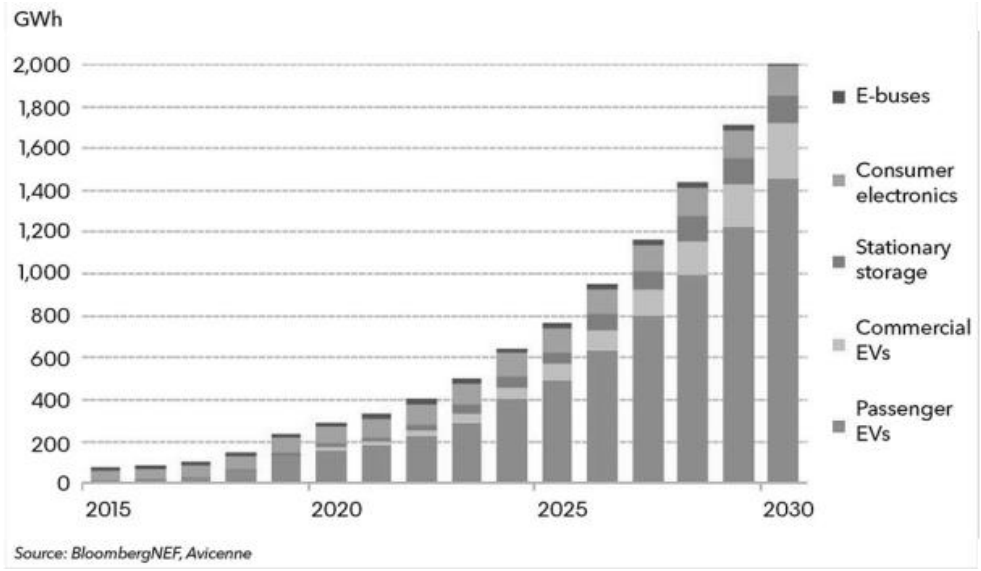

Fig. 4 Lithium Resources

Source: https://www.createai.io/blog/post/page/lithium-miners-news-for-the-month-of-may-2019

2.8 Recycling Infrastructure

With growing global demand for lithium-ion batteries and concentration of resources in a few parts of the world, the expected rise in the import costs of lithium, cobalt and other resources may prove damaging. In light of the same, it is necessary for India to take up the economic opportunity in developing the infrastructure for lithium-ion batteries, which, as per reports, offers a $1 billion industry in itself. These involve retaining the elements in the batteries and reusing them in the production process as well as carrying out second life recycling [10]. Current recycling methods, in the absence of policies and heavy Research investment, manage to generate 50% of the battery's previous economic value and the same can expectedly be made much larger in the future [10].

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2.8 Reliance on Imports

It is observable that India shall have major import bills with Lithium exporting countries, especially those in South America. However, due to recycling abilities, greater material durability as well as pre-established contracts with the countries, we can expect the same to be significantly lower than the current bills on oil imports. In this regard, we also find opportunity in extending exports to the concerned countries, especially since the lithium exporters are largely underdeveloped or developing and with resource revenue generation, shall have importing capabilities. Ties in this regard can prove to be highly beneficial.

2.9 Three Wheelers and Two Wheelers

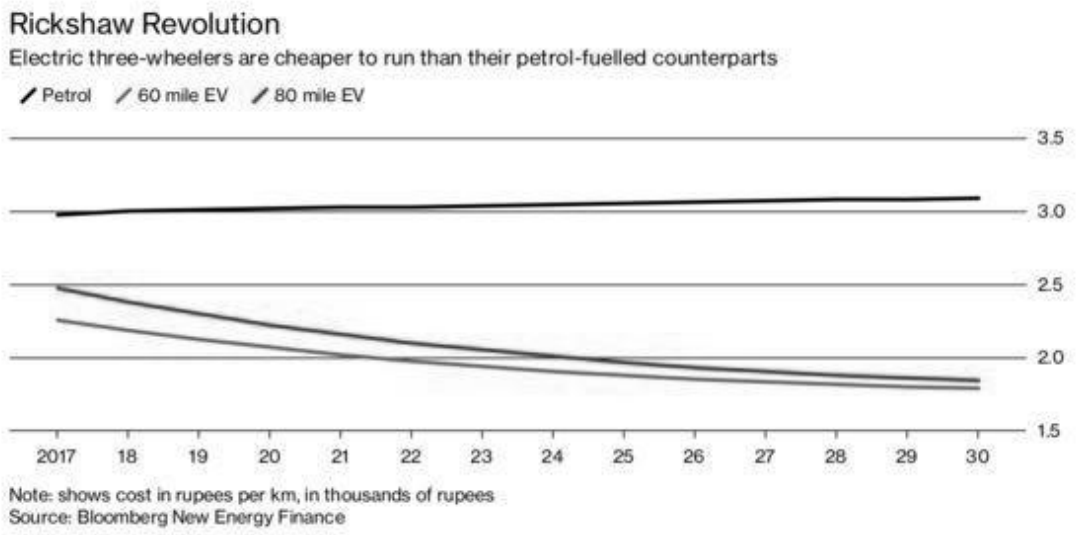

Fig. 5 Three Wheelers and Two Wheelers

Source: https://www.bloombergquint.com/business/india-s-rickshaws-outnumber-china-s-electric-vehicles

The comparative advantage of E-vehicles over ICE ones is the lower cost for distances below 100 km as charging costs for the same are lesser than fuel costs. This makes them a lucrative alternative for rickshaws and motorcyclists in cities and towns. There are an estimated 1.5 million E-Rickshaws [11] in the country and 4,50,000 E-bicycles sold in the last eight years. India is the world's largest market for three-wheelers. E-Rickshaws notably have a higher fleet in India than China and they have managed a large presence without government assistance [11, 12]. The three-wheeler market is worth $1.5 billion and for the aforementioned reasons, is the major focal point for policy making to advance E-Vehicular transport. Cab aggregators, that are dominating the urban transport market, seek to introduce E-Vehicles in their services as well. This further increases the scope for the future market. The current issue regarding E-Rickshaws is the usage of the illegal lead acid batteries which is rampant in the absence of low-cost lithium-ion batteries. The production and supply of

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such batteries is of paramount importance. Secondly, there is a lack of adequate banking finance for rickshaws in India which significantly hinders growth and prevents the sector from realising potential. An important role can be understood to be played by government subsidies and easy credit access for E-Rickshaws by banks.

2.10 Charging Infrastructure

India had 425 charging points available publicly by the end of 2017. By 2022, government and private efforts are expected to boost that to an estimated 2,800 charging points, according to BNEF [13]. It has been a primary concern for the Indian Government to enable a widespread charging infrastructure for the country; especially since long distance travel; over 100 kilometres is highly inconvenient without the same. Standards as developed by the Department of Science and Technology (DST) must be swiftly and concretely provided for the management systems regarding charging points and parks, especially public services. The various ways in which the charging infrastructure can be developed include the usage of DISCOMS for setting up such charge-points at strategic public locations and allowing private services to function with adherence to guidelines and standards as well. The major focus is recognized to be on public rather than private facilities as private facilities may not be easily availed.

2.11 Expression of Firms' Decision Strategy

There are two categories of players in the upcoming market; large automakers that are investing in Electric Vehicles such as M&M, Suzuki, etc. and fresh enterprises, many of them start-ups, that seek to provide customised technology in the market. Firms providing charging facilities may be independent or subsidiaries or collaborators of manufacturers. We consider all such firms in the following. Profit function of the manufacturer/seller:

There are two conditions that need to be satisfied for the firms to invest in India;

$(i)\ E(\pi_i) > 0$ For investment in the ith year, which is the year in which manufactured vehicles are brought to the firm must expect profit to be positive.

$(ii)\ \ \frac{dE(\pi_i)}{dt_i} > 0, [i \to 1, \dots 30]$ For long term investment, conventionally for thirty years, expansion prospects depend on profitability. The returns of the company must be expected to grow with time for the initial period in the emerging market. We consider the profit function as follows:

$E(\pi_i) = E(D_i.P_i - cD - F)$, where D_i is demand in the ith year, P_i is the price in the year, c is the cost per unit output and F is the fixed cost of investment.

$c = f(w_K, w_L)$, w_k and w_L are the rental rate of capital and the wage rate of labour respectively. A firm's variable cost is a direct function of these two. In general, it is taken

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that greater labour availability implies lesser wages and vice versa and the same for capital resources.

3. DEMAND CONSIDERATIONS

The demand for Electric Vehicles cannot be taken by policymakers to arise simply when there is a constraint in the pandemic.

3.1 Current Measures: FAME

The Faster Adoption and Manufacturing of (Hybrid) Electric Vehicles Scheme, currently in its second phase, is the Government of India's project that is focused on developing the Electric Vehicle Segment in the economy.

3.1.1 FAME I

This scheme was aimed at generating awareness about Electric Vehicles and increasing the readiness for the market to be set up along with active reduction as well. As per the evaluation carried out by the Government, it was found that the overall outcomes on fuel saving and CO2 reduction were significantly lower than the target reductions. It was observed that industry players with potential in this sector were cautious about proceeding and chose to differentiate EV activity from core capabilities. An important note in this scheme was the lack of planning on Electric Three Wheelers which is the primary means of developing a shift to clean technology, as previously elucidated. While the scheme focused solely on demand incentives via price alterations; subsidies, it failed to tap into consumer trends and sentiment which would be of primary importance in establishing reliance on commodities that are new and potentially risky investments but have major social benefits. The lack of investment in such campaigns to develop incentives lowers the cross elasticity of demand between the ICE and EVs which implies a lower impact of subsidies [15].

3.1.2 FAME II

This scheme has its objective in generating a more realised thrust of the EV market in India via an infrastructural layout and further demand incentives. We find the scheme having the same flaw that the FAME I did; reliance solely on subsidies for the control of emissions which are not conducive enough due to low elasticity. Furthermore, among EVs used for public transport and commercial purposes, there is a uniform subsidy of INR 10,000 provided for all models which again, is understandably an inefficient incentivisation model as various vehicles have different emission rates and differing attributes that may be positive or negative for the rider and the owner and importantly, have varying prices. A Deloitte Survey found consumer concerns over adequate charging infrastructure to concern 25% of consumers, more than other variables [14]. Hence, the scheme's focus on minimising emissions cannot be achieved as the demand framework is not homogenous. Given the current situation, FAME

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becomes all the more problematic due to the unfeasibility of subsidies. It is important for the government to seek better measures to deal with the lockdown [15].

3.2 Vehicular Demand Model

I consider the case of the average Indian consumer who would purchase a vehicle. This is generalised across social groups and includes final consumers who drive for private use, self-employed taxicab service people and firms that purchase vehicles for direct or indirect business purposes. For each such economic entity making a purchase, there is a binary choice between an ICE vehicle and Electric vehicle. This is a generalised model applied to different consumers and different types of vehicles. The dual commodity market exists for different categories of two-wheelers, three wheelers and four wheelers. For instance, a rural driver offering private transport services has the choice between an ICE and EV three-wheeler and an urban household has the choice between an ICE and EV four-wheeler for private usage. The following models the purchaser's utility and expresses its relationship with different relevant variables. To the single consumer, the market offers two perfect substitutes for unit consumption of a vehicle. The consumer seeks to maximize utility net of expenditure. Hence, the final utility will be the maximum of the ICE and EV vehicles respectively.

$U = Max[U(X_i), U(X_j)]$, where $X_i \; and \; X_j$ represent numerical units of Electric and Internal Combustion Engine vehicles purchased respectively. It is given that $X_i = X_j$.

In the standard case, we have $X_i = X_j = 1$. The utility functions are represented as:

$$U(X_i) = f\big(M - (P_i + t_i), P_j, (c_i + \theta_i), d_{,} \sum a_i \, , Nat_{i,}\big)$$

$$U(X_j) = f\left(M - (P_j + t_j), P_i, (c_i + \theta_i), d_{,} \sum a_{ICEV} \, , Nat_j\right)$$

Here, M is the fixed budget allocation of the economic agent for purchasing a vehicle. $M - (P_j + t_j)$ is the surplus on purchasing j with price $P_j \; and \; unit \; tax \; t_j$.

Here, $\frac{dU(X_i)}{d(M-(P_i+t_i))} > 0 \; which \; implies \; that \; \frac{dU(X_i)}{dM} > 0 \; and \; \frac{dU(X_i)}{d(P_i+t_i)} < 0$, d_i is the total distance that the vehicle i can travel in a month. This variable is a function of the vehicle's capacity, the transport infrastructure and the charging/fuel availability. c_i is the quantified value of the fuelling/charging costs incurred per unit d and θ_i is the depreciation cost per unit d. $\frac{dU(X_i)}{dc_i} < 0 \; and \; \frac{dU(X_i)}{d\theta_i} < 0$, Ai is the i-th attribute among n vehicular attributes that the vehicle has. The presence of each attribute contributes to total utility derived from the vehicle's consumption. The last variable $Nat_{i,}$ is a measure of the behavioural impact of purchasing and using the vehicle i. Ownership of the vehicle gives a signal to members of the society and may also have moral and/or psychological significance. The variable is a

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quantified value of positive significance of ownership. $\frac{dU(X_{EV})}{dNat_{i,}} > 0$ To generate demand substitution from ICE to EV in a market, the utility from an EV to the average consumer must be greater than the utility from an ICEV. Vehicular attributes are determined independently by private firms and are assumed to be beyond the policymaker's influence. Theta is taken to be a constant which is equal for both since it is determined by private players and entrants in the EV market are assumed to be efficient firms with developed technology. C for an ICE primarily includes the cost of fuelling. For an EV, it comprises charging costs. We assume that d_i is the same for both vehicles. Substituting in the Expected Profit function of firms, we get:

$$E(\pi) = (P_i - c)n.E[U(X_{EV}) - U(X_{ICE})]$$

4. GOVERNMENT STRATEGY

4.1 Pandemic Induced Constraints

Government relief packages during the Covid-19 pandemic have increased the fiscal deficit manifold. Considering the collateral damage to numerous sectors, especially labour-intensive ones and MSMEs, it is unfeasible for there to be large Electric Vehicle subsidies, especially considering the gestation lag in returns. Supply chain disruptions across the globe have caused supply crunches. The transport of lithium and other materials is restricted, causing a supply crunch. Moreover, income constraints because of reduced economic activity and unemployment shall reduce demand for vehicles in general. However, resumption of supply chain links and increase in income can be reasonably expected post the recession.

4.2 Disruption of the Automobile Sector

The ramifications of "creative destruction" of the ICE automobile sector on employment and growth are certainly concerning for the economy. In the short run, a shift in the demand shall lead to production cuts and layoffs in the industry which shall increase unemployment and hamper growth. The recent economic slowdown of the economy which has particularly impacted the automobile sector is partly attributed to government support to EVs and stringency for ICEs. In light of the slowdown caused by the pandemic, the implementation of an EV supporting policy is even riskier for the government. However, in the long run, the negative impact shall not be felt as several of the large automakers in the industry are well aware of the need for an EV shift and have been provided a sufficient gestation lag in the infrastructure set-up of the country, including battery production and charging infrastructure, to commit to Research and Development and shift their production lines to Electric Vehicles, especially since the Government provides a favourable environment in these regards. There is also scope for market share retention with existing brand values. The shift in production line shall still require largely similar functions in assembly, repair, etc. which will employ the same nature of labour with minor adjustments and perhaps slightly lower jobs but the same

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cannot be fathomed as a significant enough cost to not allow the transition. The opposite stance on ICE engines is taken as import duties on oil, higher GST rates for purchase of vehicles and lower benefits reduce market share and make production less profitable. An All India Study conducted by M/s Nielsen (India) Pvt Ltd for Petroleum Planning and Analysis Cell (PPAC) of Petroleum Ministry showed 70% of diesel and 99.6% petrol are consumed in the transport sector alone [16].

4.3 Deficit Concerns

One of the objectives of the EV push in India is to reduce its heavy dependence on oil imports which is largely generated by the automotive sector. This shall definitely be seen as possible when there is a demand shift in favour of EVs. However, as mentioned, the lack of lithium reserves in India as well as the absence of advanced technology of the kind found in the West shall require massive imports for a fully functional industry. The MoU with lithium rich countries like Bolivia and Direct Investment by Multinational Corporations in Joint Ventures shall generate lower import bills. However, in the initial investment period, the market shall not be active and automotive dominance will persist. Shift in consumer demand will also take time. Infrastructure and oil imports at this time will worsen the deficit Fiscal packages during the pandemic alongside poor tax collections have enlarged budget deficits of governments, making persistent, let alone increased, subsidization unfeasible. The best alternative for the governments, therefore, is to promote Foreign Investment in the EV sector as capital inflows shall balance imports, preventing excessive trade deficit enlargement. Investment is needed not just in vehicle manufacturing but also in charging facilities. The expectation of profits for investors must be high enough to induce capital inflows. Hence, expected demand must be high.

4.4 Co-Ordination between Buyers and Sellers Via Social Value Creation

Given the outlay, the following payoff matrix shows the co-ordination game between buyers and sellers for the EV market in India. Investment for sellers extends beyond the simple manufacture of electric vehicles to the development of charging facilities, active attribute development of the products and providing relevant clientele services to the consumers. Expected profits of sellers need to be high enough for them to invest while buyers suffer if they purchase available electric vehicles but cannot avail adequate charging facilities and other relevant infrastructure for their commodity.

Table 1. Payoff Matrix

FIRMS/BUYERS	Purchase	Don't purchase
Invest	$\pi > 0, U > 0$	$\pi < 0, U = 0$

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Don't Invest	$\pi = 0, U < 0$	$\pi = 0, U = 0$

The firm's expected payoff on investing is $p\pi_{Purchase} + (1-p)\pi_{Don't\ purchase}$

Here, $p = 1\ when\ U_{EV} > U_{ICE}\ and\ p = 0\ when\ U_{EV} < U_{ICE}$.

In the case that $U_{EV} = U_{ICE}, p = 0.5$. We assume this to be a case of normal profit for the firm where $\pi = 0 (or\ slightly\ greater)$. Given other factors, scarce charging facilities make the cost of owning EVs that require that infrastructure high. Also, the distance the EV can then travel is lower. This causes utility to be lower than that for ICEs, ceteris paribus. Given $E(U_{EV}) < E(U_{ICE})$, demand is low. Low demand, in turn, is a poor signal to firms that would invest in charging infrastructure as it reduces their expected profitability. We therefore find the situation to be at the undesired game equilibrium. In order to alter incentives, the government must raise E(U) by means of other variables. The most plausible such variable is Nat_i. The social value of an Electric Vehicle is much higher than that of an ICE vehicle because of its environmental benefit and its signal of development. Given that ICE vehicles pollute, people would prefer Electric Vehicles over them if the environmental benefits are propagated by public means [17], $\frac{dU(X_i)}{dNat_{i,}} > 0$

If Nat_i rises for EVs and falls for ICEs, $dU(X_{EV}) > 0\ and\ dU(X_{ICE}) < 0$. If trends show consumer preference for electric vehicles, expected utility and therefore, expected demand shall be high, leading to investment in charging infrastructure. With added infrastructure, the demand shall be even higher as utility will increase further with low costs and higher distance capacity of the vehicles. Hence, the game can be solved for a desired equilibrium to be achieved.

4.5 Policy Recommendations: Altering Nat_i

1. **Awareness through a nationalistic lens**: Information on the benefits of Electric Vehicles to the technological advancement, global standing and general socio-economic welfare of India should be highlighted and made known to the different social segments.

2. **Go-green media campaigns**: The Central and State governments must collaborate on a single campaign or multiple campaigns that have cultural and social connections to consumers in concerned regions with the stated motive of national welfare.

3. **Collaborative schemes with private sector enterprises** for carrying out EV promotional activities for their employees and strategizing incentives for switching using Nudge theory and other behavioural concepts.

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4. **Pitches to and talks with Multinational Companies** for infrastructural outlay and component manufacturing investment plans in India. Given successful initiation of the above, the signal for expected demand in the economy for the potential investors to consider capital infusion will be generated. The governments must then ensure proper smooth transitions.

5. A COMPARISON WITH CHINA

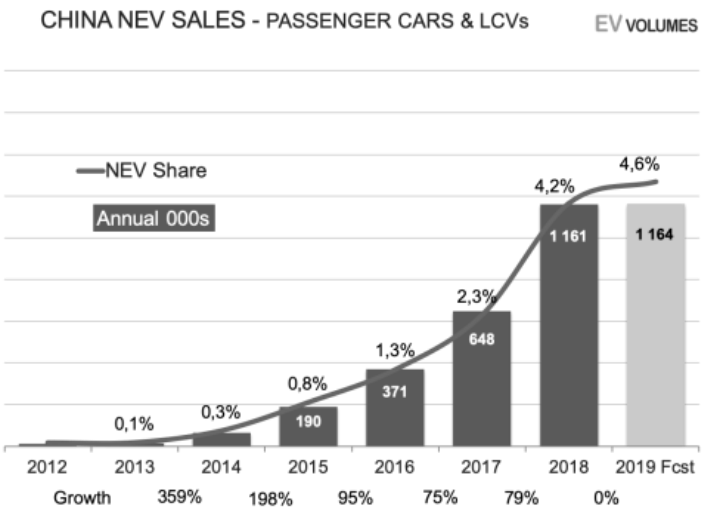

Fig. 6 Electronic Vehicle Market in China

Source: https://www.ev-volumes.com/country/china/

5.1 EV Market in China

Around 45% of electric cars on the road in 2018 were in China – a total of 2.3 million – compared to 39% in 2017. In comparison, Europe accounted for 24% of the global fleet, and the United States 22% [17]. This section analyses how China managed to create a substantial EV market for itself.

5.2 *Direct Role of the Government*

The Case of the Chinese Market for Electric Vehicles involves growth primarily via government regulation in the sector. Having begun the development of its EV market in the 1990s, China now has the largest global share of the same. The enforcement of bans on gasoline powered bikes in cities made EVs the most viable alternative. The ease of producing, selling and buying electric vehicles was actively increased by the Chinese Government when it stopped licensing for electricity powered cycles, recognizing them as "bicycles" and allowing their riders to use bicycle lanes. The Chinese government invested heavily in subsidies to consumers and subsidies for electric vehicle batteries that have helped

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increase demand significantly. Further, the use of electric-bicycles was included as one of the 10 key scientific-development priority projects in the country's ninth Five-Year Plan [18].

An estimated 8.5 billion yuan has been channelled into the green car industry from the capital market so far. The fund would help build up the country's battery output, which will be capable of supplying 150,000 electric vehicles by October 2011. The Chinese Government had planned the spending of more than 100 billion yuan to subsidise the green vehicle industry over 10 years, in 2010 [18].

5.3 Active Market

SAIC, FAW, Dongfeng, Chana, BAIC, GAC, Chery, BYD and Geely are Chinese companies in the domestic EV segment. The existence of these enterprises in a competitive market for a number of years has led to massive resource utilisation and development; unprecedented in other countries due to the lack of such enterprise. The research and development undertaken by these companies helps develop the efficiency of EVs. Alongside these, there are various research institutes in China that are highly focused on technological advancement in Electric Vehicles.

5.4 Resource Acquisitions

China has focused on major acquisitions of lithium resources across the globe; in South America and Australia, having reportedly spent $2.4 billion in South America as of January 2019. Chinese entities are said to control nearly half of global lithium production and 60 percent of electric battery production capacity [19, 20]. The aggressive purchasing strategy by China for lithium reserves has given it a crucial edge in the global EV market.

5.5 Lessons for Government Role

Considering the harmful nature of gasoline-based motorcycles, it is in India's interests to ban them. Although this is currently unfeasible, it can be done post-recession recovery. A highly beneficial strategy, as implemented in China, would be the de-licensing of electric two wheelers the way they have been in India. Secondly, given the absolute state control in China, it is easier for the government to facilitate demand changes. Although India cannot do the same, being a democracy, nationalistic sentiments and active awareness campaigning can be substitutes for changing market preferences. Concerns here arise due to the persistent hazards of Indian traffic and sub-cultures of non-adherence to road regulations. However, this policy is readily adoptable for Electric two wheelers with lower speed capacities as a boost to the industry. A potential advantage India has in this sector is the strength of the three-wheeler market; as seen in China, state incentives that make it easier for businesses to operate using EVs have proved beneficial and here, there is a need for easy acquisition and running of these vehicles. Credit availability by state run banks and reduced regulation in obtaining E-vehicles alongside taxation benefits shall boost the demand for such vehicles. Also, taxation benefits

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to software-based cab aggregators for electric three wheelers and two wheelers shall introduce lucrative incentives in a competitive sector.

5.6 Resource Availability

The dominance in the supply side has been crucial to China's growth. There is an urgent need for India to create strong links for low cost availability of lithium carbonate, cobalt and other necessary raw materials. In this regard, the acquisitions sought by Khanij Bidesh Ltd. in South America and Australia as well as the MoU between India and Bolivia seek to be highly important for ready availability. It is in India's interests to have further acquisitions in the same regard.

5.7 Market Development: Foreign Collaboration

State investment in R&D has been major contributors to growth in China. The same must be done via focused projects by the Department of Science and Technology and institutions like the Indian Institutes of Technology for providing means of achieving greater efficiency. It is notable here that while there have been foreign collaborations for Chinese firms, FDI in EVs have not been a pusher of growth in the country. However, the noticeable fact in China's self-sustenance here is that the growth objectives have been met over more than two decades since inception and with high quality of technology, both of which are not feasible in India's considerations. In this regard, it is necessary for India to collaborate with MNCs initially, especially firms such as Tesla and Panasonic, with their self-stated goals of electrification in Asia.

6. IMPACT

6.1 Environmental Benefit

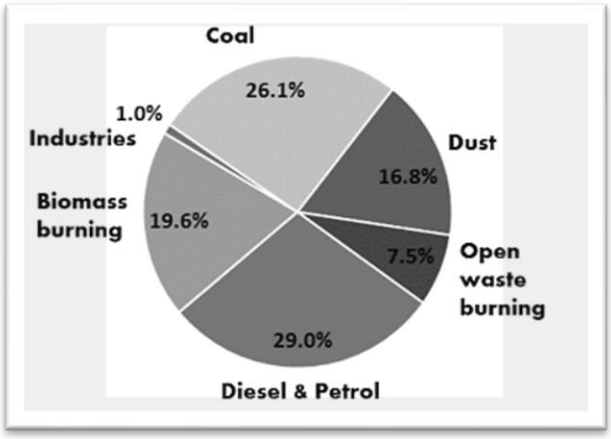

Fig. 7 Environmental Benefit

Source: https://urbanemissions.info/blog-pieces/whats-polluting-delhis-air/

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Delhi in India, as per a WHO survey, is the most air-polluted major city in the world. A major contribution to the same is the vehicular emissions in and around Delhi. Vehicular emissions have various environmental costs which include various diseases and health hazards. The global cost of transportation-attributable health impacts in 2010 and 2015 was approximately USD one trillion. Being the second largest population in the world and with often failing control mechanisms, India involves a large portion of this expense. Reducing reliance on carbon emitting fuel and shifting to Electric Vehicles shall majorly benefit the Indian society and economy. The indirect benefit of lower GHG emissions in India via reduced heating and climate change shall protect the interests of agriculture and forestry based endogenous communities and assist bio-diversity preservation.

6.2 Shift from Oil and Employment Generation

European Climate Foundation has estimated that through reducing oil demand by more efficient electric cars, employment will increase by 5,00,000 to 8,50,000 by 2030 [21]. In Europe, oil production and distribution has very low employment intensity of just four jobs per million Euros value added compared to 24 jobs per million Euros in the general economy and we understand a similar difference in the Indian economy [22]. Therefore, any shift in expenditure from buying imported oil to other expenditure choices can be understood to generate excess employment.

6.3 Rural Connectivity

Metro and bus services are unavailable in most areas in the country that lie outside the ambit of large cities. In such towns and cities, the only public transport options available are auto or manual rickshaws. Hence, early conversion of these rickshaws to Electric Vehicles using Lithium-Ion batteries shall provide clean transport to a significant number of individuals. Three-wheelers and two-wheelers are the primary mode of transport in most villages for reaching bus-stops or highways. Quick conversion to electric vehicles here will ensure clean transport in villages, especially with battery charging and swapping outlets in larger villages, which are employment generating. This shall also see penetration in freight movement and agricultural connectivity in rural areas that are managed by rickshaws, autos and tempos which are suited for replacement with Electric Vehicles. All of the above results aggregate the positive impact of an EV shift in India.

7. CONCLUSION

In the absence of industrious policies for the future growth of Electric Vehicles, the future introduction of Electric Vehicles shall be problematic for the government with regard to its fiscal problems which have been exacerbated by the 2020 pandemic. As the developed world is focused on early adoption of Electric Vehicles and direct competitors like China have already been successful in the same, it is imperative for India to develop self-sustenance in EV manufacturing and leverage in global markets as it would otherwise make the economy

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more reliant on imports and vulnerable to market shocks and unfavourable policies of other governments. While ties with South American and other governments have been established and potential plans have been made, foreign direct investment and active private sector participation via foreign direct investment are primarily needed for economic boosts to the sector. India has a key opportunity in harnessing strong nationalistic sentiments for the creation of effective demand to do away with coordination failure in the EV market with minimized burden on the financial resources of the country. Moreover, the successful implementation of such campaigns would augment the generation of desired market equilibria without direct price interference by the government.

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STUDY OF RELATIONSHIP BETWEEN JOB SECURITY AND WORK LIFE BALANCE FOR FEMALES DURING COVID-19

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ABSTRACT

This study is aimed at analyzing the relationship between Job Security and Work Life Balance with Anxiety of working females in Education sector, during COVID-19 Pandemic. The study is designed to identify that which factors conjointly leading to job security and work life balance significantly affect the anxiety level of the female workers of the education sector. The COVID-19 outbreak has resulted in new normal everywhere and there is no one the world who has not felt the cascading effect of this catastrophic situation. Everyone is suffering with an untold psychological pressure. A sample of 200 females working as teacher (100 from Delhi & 100 from Bhopal) was taken to check the anxiety level during this pandemic situation. A self-developed questionnaire (Cronbach's alpha 0.9) was used to record the responses on Job security and Work life balance. The response was recorded on a 5 point Likert scale (1= strongly disagree and 5=strongly agree). Regression analysis was conducted to find out that whether the variance caused in the dependent factor that is anxiety is significantly because of the independent factors like Job security and work life balance. ***Generalized anxiety Disorder Scale*** *was used to calculate the anxiety score. This scale is most commonly used instrument to check the anxiety disorders in clinical practices due to its diagnostic reliability and efficiency. Results showed that few sub factors under job security and work life balance, such as worrying about pay cuts and salary issues and not being able to balance the professional and work life during the pandemic are significantly affecting the anxiety levels of female workers.*

Keywords*. COVID-19, Pandemic, Female workers, Education sector, anxiety*

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1. INTRODUCTION

As of now the situation demands measures like lockdowns, debarring of human movement and measures of self-quarantine throughout the world. However, the ever burdened women are now burdened more as the test for a work life balance begins here. They are continuously home bound and the care of the family is their major concern. The data from the Organisation for Economic Cooperation and Development (OECD) reveals that "Indian women do nearly six hours or unpaid care work each day. Indian men, on the other hand, spend less than an hour on an average doing the same. Globally, women perform 76.2% of total hours of unpaid

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care work." UNESCO says "300 million children are missing school globally due to the current virus outbreak, increasing the responsibilities of women" According to a 'Time To Care', a report by Oxfam, women and girls spend 3.26 billion hours of unpaid care work each and every day, making a contribution to the Indian economy of Rupees 19 lakh crore per year, which is equivalent to 20 times the entire education budget of India.

The females in the education sector are trying to adjust to the new normal almost every lecture. They were trained to perform tasks usually with chalk and talk method and eventually were evolving as the technology immigrants who have to adapt to the new ways of teaching, by integrating technology. The usage of online mediums such as Zoom , Webex, Google Meet apps and so on is a challenging task to learn in a short span of time. It became more difficult and painstaking when the parents of the students sit and judge the teachers while they are taking classes.

According to the literature available it was found that many factors like worrying about the job security during adverse times, work life balance future planning and lack of social support have caused increased levels of stress among females more as compared to the male counterparts.

This change of work environment due to this situation of pandemic has led to the cascading effect on females working in all the sectors of the economy and not only education.

"Anxiety is a human emotion. Everyone experiences it. Although anxiety is a very common human experience, the descriptions that people provide are quite varied".
.

Anxiety experts usually explain anxiety and anxiety disorders using the bio psychosocial model. "The bio psychosocial model proposes there are multiple, and inter-related causes of pathological anxiety. These causes can be roughly categorized into three main groups".

- Biological causes
- Psychological causes, and
- Environmental or social causes.

"Psychological stress occurs when a person perceives that environmental demands tax or exceed his or her adaptive capacity. The studies of psychological stress focus either on the occurrence of environmental events that are consensually judged as taxing one's ability to cope or on individual responses to events that are indicative of this overload, such as perceived stress and event-elicited negative effect" (Cohen et al., 2007).

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Both the constructs mentioned in the theories of anxiety and psychological stress point out the effect of the surrounding environment on anxiety and depression.

COVID-19 pandemic has posed such difficult times for everyone that the environment around us has become a source of negativity and discomfort. In these adverse times working women have been listed among the most vulnerable members of the society in this situation. The constructs of anxiety and stress mentioned above definitely show that environment around a human being deeply affects his or her mental wellbeing and also manage the level of stress and anxiety.

Therefore, studies based on exploration of factors that affect the stress levels people in the diverse fields, help to find the remedies for such problems like anxiety, stress and depression. The situation prevailing in the world due to the global pandemic has made like dismal for many. Therefore, the significance of this study lies in the fact that the factors of such anxiety and stress need to be defied. The definition of such factors is important for suggesting remedial action.

2. REVIEW OF LITERATURE

The corona virus is having a negative impact on the societies of mental health**.** (Özdin, 2020) This pandemic condition can affect mental health of individuals. The purpose of this study was to evaluate the levels of depression, anxiety and health anxiety in Turkish society during the COVID-19 pandemic, and to examine the factors affecting these. The corona virus effect was tested on the patients, relatives with previous and present psychiatric illness with different age group. Higher score of depression was found between woman, those who were individuals living in an urban area, individuals with COVID positive patients among friends or relatives, individuals with current or previous psychiatric illness history and individuals with chronic disease." Anxiety scores were significantly higher among women, individuals with a COVID 19 patient among friends and relatives and individuals with a current psychiatric disease (Özdin, 2020).

A study was conducted to study the effect of lockdown on anxiety, depression and insomnia in Bangladesh, by Pappa S et al, in 2020. The study included thirteen studies which were analyses to conclude the symptoms of 33,062 respondents. 12 studies anxiety with a result of 23.2% suffering with anxiety and there were ten studies that studies the symptoms for depression and concluded that 22.8% of the participants were found to be depressed. An analysis of a subgroup concluded that there was difference based on gender and occupational difference. The nurses and female health care workers showed higher rates of depression and anxiety and result was insomnia. It was also concluded in the study that 38.9% of the people were found to be suffering with insomnia and 5 different studies were conducted to conclude the same. The study also concluded that the people working are exposed to such conditions which lead them to experience mood and sleep disturbances. Thus, there was a need to find

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out ways to deal with these mental health risks and also find out the ways to mitigate the losses during this pandemic. Therefore, this study definitely points out that the stress and anxiety levels during this pandemic have certainly much to do with the gender differences also.

Another study conducted in Bangladesh in 2020, by Islam SMD et el. It studied 340 Bangladeshi adult population including both males and females. It tried to test the possible human stress caused due to this pandemic. The study concluded that 85.60% of the population studied are showing symptoms of stress that result in sleep shortness, unrest in the family and insomnia. This also was found to result in hampering the link between economic problems and food crisis situations, ruining the study plans and career plans for job seekers. The study suggested the need for amendments in the time-oriented policies and policies of care monitoring plans so that this pandemic oriented psychological challenge can be dealt effectively.

Another study conducted in May 2020, aimed at analysis of already done research works to explore the relationship between prevalent anxiety and the related factors. The studied reviewed had been published in all leading journals indexed in Scopus, Pubmed and similar lists. It was a systematic review through the random effect model a meta-analysis was done. A total of 9074 respondents were selected and studies. The results showed prevalence of anxiety in 31.9% out of samples studied in 17 studies and depression in 33.7% of the sample population studied in 14 studies. It was concluded from the study that COVID 19 pandemic has been the reason for causing for numerous psychological disorders. The impact has been so bad that it affected the health status of almost all communities and areas. It was advised to improve psychological intervention to help people recover from this pandemic's anxiety and stress.

The study conducted and published on June 27th, 2020, under the title "Challenges for the female academic during the COVID-19 pandemic" pointed out the challenges faced by the female researchers during this pandemic. It was also found out that there was huge loss of scientific and academic contributions by female academicians, reducing their contribution to the significant public domains. Thus, women have been affected in numerous ways and not only on the domestic front.

A study conducted in Iran in 2014, studied a sample of 114 EFL teachers working in universities and related educational fields. The results of this study stressed on females having high anxiety and stress levels due to inability to balance the interpersonal relations and the stress caused due to non-completion of domestic chores on time. There were other factors highlighted by the study that caused the stress levels to be high. These factors were less expertise in using the technology, and inability to build their own resource base.

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A study in Meerut, conducted in 2015 suggested that the working environment and related ideas about the working women are directly related to stress levels caused in them. Again the parameters of work life balancing that cause anxiety remain the same.

To assess the indications of depression and anxiety and stress scale was employed. The impact scale was used to analyze the emotional situation. The moderate to severe outbreak impact was shown by the respondents. Students of different streams like Arts, Science, Social Sciences, and Law scored higher in relation to anxiety, depression, stress with respect to engineering and Architecture students. Staff of university showed lower scores in all measurements in comparison to the students who suffered psychological impact in the first week of Covid 19. As a preventive measurement to the crisis related to the psychological services, mental health monitoring system needs to be adopted in future. In the survey total of 3707 participants, 2530 were from the Valladolid University. Higher significant depression and anxiety was found in the university students as compared to the university workers (Odriozola-gonzález et al., 2020).

The aim of this paper was to understand the adoption of technology in teaching learning process, in the student and faculty experience towards virtual classrooms during COVID-19. In this study inductive reasoning and qualitative research method is used for collecting the data from the faculties in Bangalore. This research study suggests that the in this pandemic time faculty has undergone technology adoption process and the involvement of students in various online modes of learning. Faculties and students were very conscious, in anxiety and in fear due to this COVID-19. The research is restricted to comforting prospects of COVID-19 and changes in education system with adaption of technology and engagement of students with various virtual sessions (Shenoy et al., 2020).

Globally the distress is the cause of COVID 19. Serious damages can be observed in the public mental health due to infected cases. Like other countries in the world India has also implemented lockdown nationwide to curb the virus transmission. This research is an attempt to study the psychological distress among the Indians during this lockdown. The present study is a frontrunner in exploring levels of anxiety, stress, and depression in the Indian population. The research findings indicate that students and health professionals need special attention because of their higher psychological distress. The Government bodies, agencies and NGOs are very instrumental in distributive work, delivering essential items to those who don’t have their supplies. Lastly, policymakers also need to care for students and health professionals as the main stakeholders in the society (Rehman et al., 2020).

The COVID-19 has created confusion, changed the living situations of public with reducing restrictions, terror of transmission of disease and shut down of business and the closure of institutions. These all have psychological impact like depression and anxiety. However, most studies only have focused on clinical data. In this study the psychological impact related to depression, stress and anxiety was experienced during outbreak. In this research study 1210

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total participants from 194 cities answered the questionnaires online. The author showed that 53.8% showed the impacts of outbreak. Finally 16.5% of respondents noted moderate to severe level of depression, 28.8% showed anxiety and 8.1% noted stress (Bavel et al., 2020).

Chinese scientists conducted a study in May 2020, with respect to the mental anxiety and gender differences affecting the level of anxiety during the times of COVID 19. It was found that nearly 14% of the sample resulted to be in depression and nearly 13 % was found anxious and rest were found to be depressed and anxious both. The results of this study definitely state that the anxiousness of people has definitely increased due to this pandemic. It is very natural indeed. It was also concluded that females were found the target of high anxiety as compared to male counterparts. The most vulnerable group to be found being affected with anxiety were the females who were working and balancing the domestic life also.

Raza Ali conducted a study in 2019. It was a case study conducted in Istanbul on the work life balance and the level of stress of the women in education sector. The study concluded that the difficulties faced by the married working women are extended working hours, bad attitude of the bosses, resulting negative attitude of the family members, inability to complete the domestic work on time and excess burden results in high level of anxiety and stress.

A study conducted in Iran in 2014, studied a sample of 114 EFL teachers working in universities and related educational fields. The results of this study stressed on females having high anxiety and stress levels due to inability to balance the interpersonal relations and the stress caused due to non-completion of domestic chores on time. There were other factors highlighted by the study that caused the stress levels to be high. These factors were less expertise in using the technology, and inability to build their own resource base.

3. RESEARCH METHODOLOGY

3.1 Research Objective

- To identify the relationship between job security and work life balance with anxiety level among working females in education sector, during COVID -19.
- To check the anxiety level among the working female teachers in Education Sector during COVID -19.

3.2 Research Scope

The model was fitted to find out whether the factors constituting job security and work life balance are significantly affecting the anxiety level of the females in education sector. The model tends to generate results that will bring out that which factors have resulted in significantly raising the anxiety among the respondents, during the pandemic period. This

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research will be helpful in determining a fair set of corrections that have to be done so that the females can worry less and participate more in the work force.

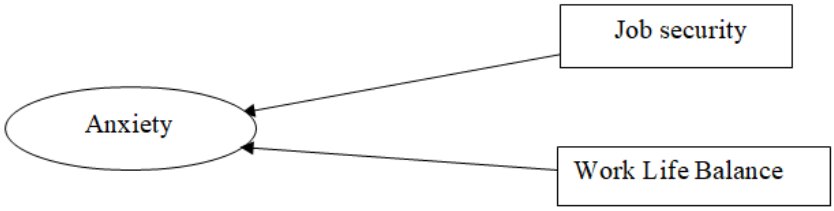

Fig. 1 Research Model: Factors Influencing the Anxiety Level

3.3 Research Design

The sample was drawn on the basis of cluster sampling. The clusters made were (1) From the city of either Bhopal or Delhi (2) females (3) working in education sector (4) aged between 20 to 60 years. Bhopal and Delhi were selected because Delhi is a metro with very fast paced life and Bhopal is a B2 city with a relatively slow velocity of work life. A total of 200 respondents were contacted and all filled the questionnaires (100% response rate. A pilot survey was done with 30 respondents first and the reliability of the questionnaire was checked which came out to be considerable high (Cronbach's alpha = 0.90). The questionnaire consisted of 16 items in total and was interpreted on a 5-point Likert scale. To check the anxiety Level of the participants a 7-item Generalized Anxiety Disorder Scale (GAD-7) was used. The GAD-7 includes seven items based on seven core symptoms and inquires the frequency with which respondents suffered from these symptoms. Respondents report their symptoms using a 3-item Likert rating scale ranging from 0 (*not at all*) to 3 (*almost every day*), such that the total score ranges from 0 to 21. The GAD-7 is a well-validated screening instrument, and it has demonstrated excellent internal consistency (Cronbach's α = 0.940). The factors were coded as follows for regression analysis.

Table 1. Factors for Regression Analysis

Factors	Index	Item
Job Security	I am worried about the pay cuts and Salary issue	JS1
	I am worried about my retainment in the organization	JS2
	I have a fear of losing my job	JS3
	I have a high level of performance pressure	JS4
	I feel insecure that I might lose Productivity due to Technological Instability	JS6
Work Life Balance	it is difficult to manage both household work and office work	WLB1
	I am not able to justify my presence at home and office together	WLB2
	I feel insecure moving out for work due to the chaotic situation around me	WLB3

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Anxiety	Feeling nervous, anxious, or on edge	AN1
	Not being able to stop or control worrying	AN2
	Worrying too much about different things	AN3
	Trouble relaxing	AN4
	Being so restless that it's hard to sit still	AN5
	Becoming easily annoyed or irritable	AN6
	Feeling afraid as if something awful might happen	AN7

4. DATA ANALYSIS

4.1 Age Composition of the Respondents

A sample of 200 females working in the education sector has been taken to check the anxiety level. The age composition of the respondents is as follows:

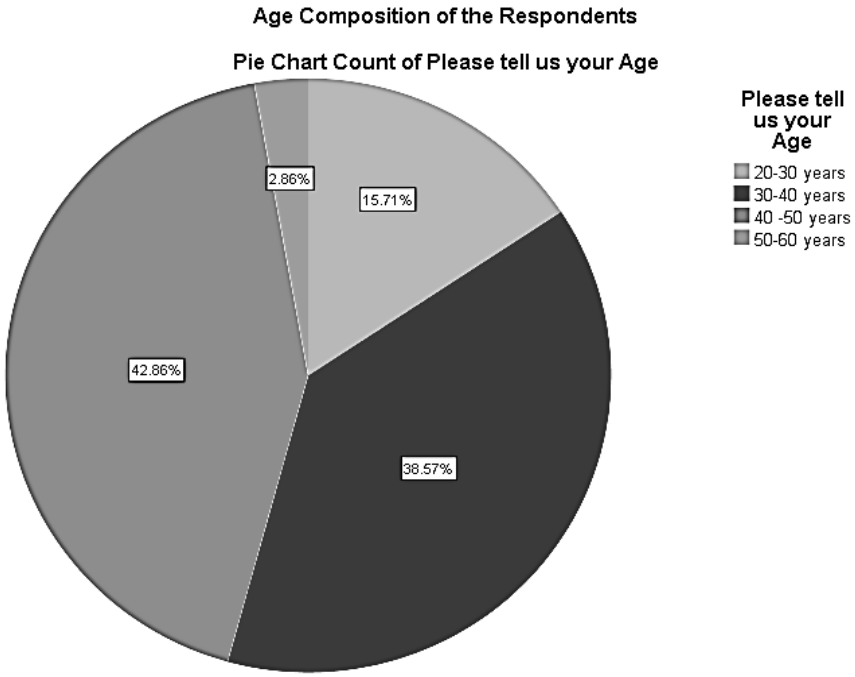

Fig.2 Age composition of Respondents

It is seen from figure 2 that highest percentage of respondents are from the age group 40-50 years that is 42.86%, followed by the age group 30-40 years, 30.57%.

Regression analysis: SPSS version 25 was used to calculate the multiple regression between the various factors constituting job security and work Life Balance and their effect on Work Life Balance.

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4.2 Regression between Anxiety Scores and Job Security

Table 2. Descriptive Statistics

	Mean	Std. Deviation	N
ANSCO	1.59	.778	200
JS1	3.74	1.030	200
JS2	3.03	1.141	200
JS3	2.98	1.293	200
JS4	3.57	1.110	200
JS5	3.31	.941	200
JS6	2.87	1.197	200

Table 3. Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	JS6, JS5, JS1, JS4, JS2, JS3[b]	.	Enter
a. Dependent Variable: ANSCO			
b. All requested variables entered.			

Table 4. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.598[a]	.358	.338	.633	.358	17.933	6	193	.001
a. Predictors: (Constant), JS6, JS5, JS1, JS4, JS2, JS3									

Table 5. ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	43.152	6	7.192	17.933	.000[b]
	Residual	77.403	193	.401		
	Total	120.555	199			
a. Dependent Variable: ANSCO						
b. Predictors: (Constant), JS6, JS5, JS1, JS4, JS2, JS3						

Table 6. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.261	.266		4.747	.001	.737	1.784
	JS1	-.012	.057	-.015	-.206	.837	-.124	.100
	JS2	-.153	.072	-.224	-2.121	.035	-.295	-.011
	JS3	.171	.079	.285	2.159	.032	.015	.328
	JS4	.065	.056	.092	1.150	.251	-.046	.176
	JS5	-.200	.052	-.242	-3.817	.001	-.304	-.097
a. Dependent Variable: ANSCO								

Table 4 shows the summary of the model fitted. ANSCO describes the total anxiety score of the respondents after the summary of the three-point scale of the GAD questionnaire. The

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model is significant, taking alpha = 0.05. The adjusted r square that is the coefficient of determination is 0.338 which explains that 33.8 % of the variance in the anxiety level is caused by each of the independent factors that form a comprehensive factor job security. Table 5 shows the analysis of variance where the F value is 17.933, and the table value is much lower than the level of significance that is alpha = 0.05. Therefore, it can be concluded that the dependent variable is reliably predicted by the independent variables. Table 5 shows that the factors under job security, that affect the anxiety level significantly (P value less than 0.05) are worrying about being retained in the organization, fear of losing the job, performance pressure and loss of productivity due to not being technologically sound.

4.3 Regression between Anxiety Scores and Work Life Balance

Table 7. Descriptive Statistics

	Mean	Std. Deviation	N
ANSCO	1.59	.778	200
WLB1	3.48	1.186	200
WLB2	3.08	1.221	200
WLB3	3.76	.990	200

Table 8. Variables Entered/ Removed[a]

Model	Variables Entered	Variables Removed	Method
1	WLB3, WLB2, WLB1[b]	.	Enter
a. Dependent Variable: ANSCO			
b. All requested variables entered.			

Table 9. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.518[a]	.268	.257	.671	.268	23.962	3	196	.000
a. Predictors: (Constant), WLB3, WLB2, WLB1									

Table 10. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	32.351	3	10.784	23.962	.000[b]
	Residual	88.204	196	.450		
	Total	120.555	199			
a. Dependent Variable: ANSCO						
b. Predictors: (Constant), WLB3, WLB2, WLB1						

Table 11. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.598	.194		3.085	.002	.215	.980
	WLB1	-.044	.062	-.066	-.700	.485	-.166	.079

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	WLB2	.356	.060	.558	5.913	.001	.237	.474
	WLB3	.012	.058	.015	.198	.843	-.103	.126
a. Dependent Variable: ANSCO								

Table 9 shows the summary of the model fitted. The model is significant, taking alpha = 0.05. The adjusted r square that is the coefficient of determination is 0.257, which explains that 25.7 % of the variance in the anxiety level is caused by each of the independent factors that form a comprehensive factor work life balance. Table 9 shows the analysis of variance where the F value is 23.962, and the table value is much lower than the level of significance that is alpha = 0.05 Therefore it can be concluded that the dependent variable is reliably predicted by the independent variables. Table 10 shows that the factors under work life balance, that affect the anxiety level significantly (P value less than 0.05) is failure to justify the work and life at the same time.

4.4 Analysis of Anxiety Level of Respondents

Table 12. Table Showing Percentage of Respondents Under Different Anxiety Levels

No of respondents	Anxiety scores	Anxiety level	Percentage
80	0 to 9	Mild level of anxiety	40%
52	10 to 14	Moderate level of anxiety	23%
68	15 to 21	Severe level of anxiety	37%
Total = 200			100%

Table 12 shows that 40% of the respondents are under mild anxiety level during this pandemic and 37% show symptoms of severe anxiety. 23% of respondents are showed symptoms of moderate level of anxiety.

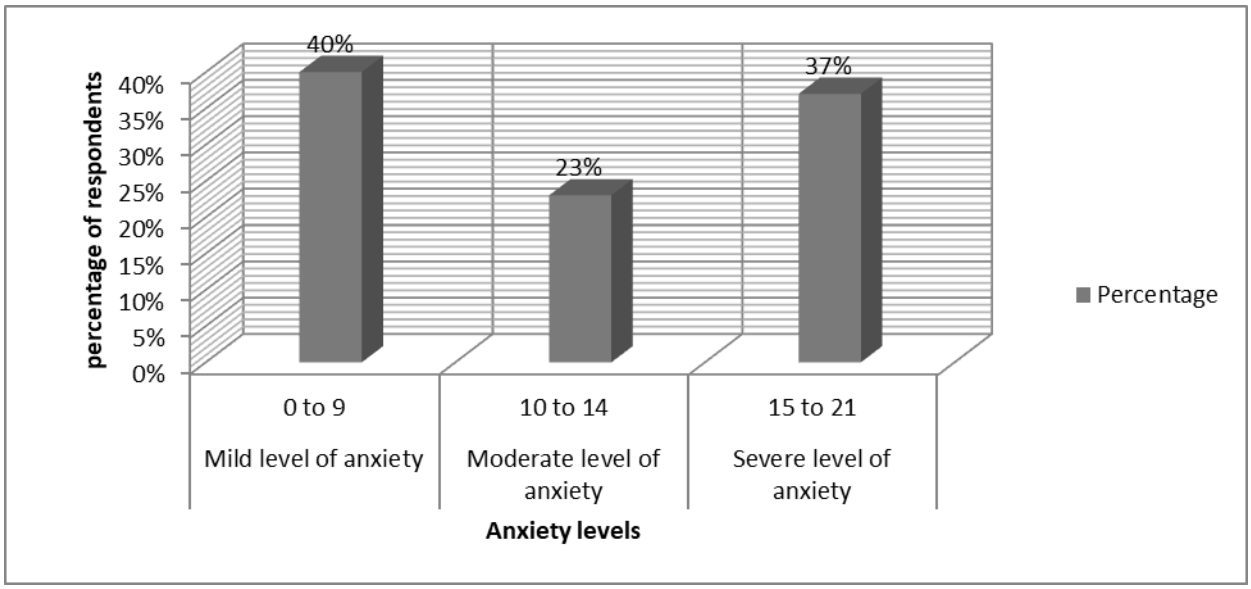

Fig. 3 Analysis of Anxiety Levels

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5. RESULT

The results of the multiple regression analysis shows that the factors that affect the anxiety level of the females working in the education sector significantly ($\alpha = 0.05$), during this pandemic are fear of losing the job (Mean score 3.03) , worrying about salary issues and pay cuts (Mean score =3.73) performance pressure (Mean score 2.98) , loss of productivity due to not being technologically sound (Mean score 3.31), failure to justify their presence both at home and work(Mean score 3.28), feeling socially disengaged(Mean score 3.25) and feeling of being less connected to people near to them due to social distancing.(Mean score 3.15).

It was also found by analyzing the scores of the GAD questionnaire that 40% of the respondents are under mild anxiety level during this pandemic and 37% show symptoms of severe anxiety. 23% of respondents are showed symptoms of moderate level of anxiety.

6. DISCUSSION AND CONCLUSION

To identify the relationship between Job security, Work life balance and anxiety level among working females in Education Sector, during COVID 19. Additionally, the research focused on checking the anxiety level among the working female teachers in Education Sector during COVID 19.

The area was explored using multiple regression analysis and it tried the impact of different independent factors on the dependent i.e., the degree of anxiety in working females in Education Sector. Out of these autonomous variables, Job Security was found to have the greatest effect on Anxiety followed by work life Balance viability, being verified with the help of significance test.

So higher authorities should attempt to make their environment bother free, secure and advantageous. They ought to likewise deal with this pandemic and ought not to pressurize their female workers since they are managing new parts of educating and technology which they are not comfortable off. They ought to be given a tuning period to change in accordance with this situation. This time is to have the genial relationship with every other. Likewise, a thought ought to be dealt with viewing working hours as it is hard to the female instructors to make the timetable for family as per calling work plan. The policies should have female participation also in the executive bodies for planning strategy outline work with the goal that they may recognize the problems faced by the female workers in the execution of such policies. After all, an anxious worker seldom delivers his or her best.

7. MANAGERIAL IMPLICATIONS, LIMITATION AND THE FUTURE RESEARCH

The results and findings of the research will help the Education institutions to roll out the improvements in their approach and they may get the data what precisely their female

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instructors are stressed off and attempt to make them calm so that 100% timely execution of work can be done. It will likewise assist the educationist with understanding the need of the time of this pandemic and inspire the female workers towards their interest. Research can be led further to distinguish the components influencing the Education Institutions while working and searching for the improvement of their employees. Further the research can be done to explore the psychological components which generate tension based on Demographic variables like age and income.

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SITUATING VARIOUS TRENDS OF INTERPRETING MEDICAL LITERATURE IN THE CONTEXT OF COLONIAL BENGAL: A CRITICAL APPROACH TO DECONSTRUCT SOCIAL HISTORY

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ABSTRACT

The essential theme of this paper is to locate the vivid interpretations of medical literature in colonial Bengal to trace the discourses on public health based on the health reforms and the native responses. The research method which has been chosen for this paper is specific to qualitative approaches highlighting literature review or deciphering the primary sources. In the domain of public health history of colonial times we experience certain established norms as posed by the social scientists. These prototypes are needed to be analyzed again to get more intensive perspectives. Therefore, whether the British tried to 'colonize the body' or they launched the 'tools of empire' to make us civilized – are the serious academic concerns to be restructured. This paper harps on the politics of language which is important to understand the complexities of public health situation in the said period. The dichotomy has to be addressed between army and public health to locate the priority of the colonial masters which might set a new trend to revisit the history of diseases and epidemics. This attempt is aimed not only to break the prototypes of the existing public health domain, also to resituate the contemporary society for experiencing better the reactions of the native population. The author wants to critically assess/deconstructs the social history of the colonial times through the lenses of medical literature.

Keywords. *public health, epidemics, medical literature, colonial government, native responses, vernacular heath journals, new approaches*

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1. INTRODUCTION

It is difficult to define the scope of literature as it is as vast as an ocean. The term medical literature does not limit our understanding with regard of medical terminologies. Rather if a literature states something relevant in terms of health and medicine can be considered as medical literature. I have chosen some of the prominent vernacular health journals of the colonial period and the other writings for this lecture or to initiate a specific discourse. There are certain questions in my mind to validate my arguments or the hypothesis. These are such

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as- how can we reconstruct or deconstruct the social history of colonial Bengal in terms of vernacular health journals? Secondly, what should be the ways or approaches to revisit those days?

2. LOCATING THE DISCOURSE FROM THE THEORETICAL PERSPECTIVES: REVISITING THE WRITINGS ON HEALTH

Here the research method which I have followed is based on certain theories related to the philosophy of history and I dealt with the facts which are not the mere narrations of the past as this area is widely explored or exhausted. If I would like to begin with my knowledge of the medical history then I will definitely quote Collingwood, who once stated, social customs are important for the historians as these help to develop their own ideas based on the established norms and morality so that the historians can experience the past according to their own understanding [1].

In the history of science and medicine, specifically in the sphere of public health, we find various opinions leading to different discourses and debates emphasizing the intricacies of human minds. How a diseased nation can transform the mind-set of the people is very much pertinent if we think of the present Covid-19 situation. Similarly, the health journals of the colonial times in Bengal signified the mental and physical agony of the natives and the colonial apathy of introducing necessary reforms which indicate towards a state of despair embedded in negativity. It was a situation which did not reflect any hope and the future was also uncertain. The writings were full of substantial thoughts as sufferings of the natives were eternal. For example, in her article on Malaria in Bengal Prabhabati Devi Saraswati depicted how then poor people never got escaped from the clutches of the above-mentioned ailment [2].

In Mitraprakash (circulated from Dhaka), an article was published in 1872 on the book review of Kabita Manjari, a collection of poems by Srimati Basantakumari. She was the wife of a landlord and had already earned fame as a poet. During her prolonged illness she wrote many soulful poems which were later compiled in Kabita Manjari [3]. From this piece of literature, it is evident that in colonial Bengal, the health services were unsatisfactory irrespective of the social status of the people. It was a time, when not so famous poet Laxmimani in her poem on Burdwan fever murmured the unsung stories of those who lost their near and dear ones in Burdwan fever and this poem is soulful as it was based on experiencing the grey shades of life sunk in the reality [4].

Nowadays most of the research have an interdisciplinary nature and from that perspective it can be said that history of medicine or public health is also an integral component of the investigations on social sciences. Here one can mention about the theory of positivism by Auguste Comte. As we know Comte emphasized on real life experience and facts. On the other, through the '*Law of three stages' [5]*, he stated that, to describe the development of social progress the positive stage utmost matters [6]. Here if we would like to justify the

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theme of the lecture in the light of Comte's argument, then it is evident that, the presence of perceptible public opinion represents a subjective discourse based on human emotions, on the contrary, history also seeks objectivity or information. The above-mentioned literary examples reflect harsh realities and contribute towards the formation of the discourse on public health with an insight of embracing humanist historiography.

3. THE COLONIAL CULTURE OF SUBJUGATION – DECODING SAIDIAN PERSPECTIVE

In my opinion, it is important to expose how the colonial culture propagated a subtle notion of subjugation of the native minds through the tools of knowledge or wisdom. As for example, Edward Said while discussing the discourse on colonialism, gave emphasis on the imperial interests of the colonisers, where culture played the role of a metaphor. He stated, "*I think one of the main flaws in the enormous literature in economics and political science and history about imperialism is that very little attention has been paid to the role of culture in keeping an empire maintained [7]."*

Now the question is, what is the definition of '*culture*' as mentioned by Edward Said? According to Badaruddin Omar, the ruler or the imperialist often makes his own culture as a weapon of domination and concentrates for the betterment of that specific culture. This creates cultural backwardness of the colonized [8]. It can be presumed that, *"for the progressive and political movements, cultural backwardness of the people and the lack of critical thinking creates obstacles, and the ruling class wants to retain this retardation [9]."* This cultural dominance, of the rulers was described by Gramsci as '*hegemony' [10]*.

4. HEALTH AND NATIONALISM: THE *BHADRALOK* CLASS AND THE COLONIAL MASTERS

We all know that during the colonial times, many journals were published in vernacular and some of them dealt with health-related issues. We have seen what kind of articles these health journals used to publish. Now the question is who were the readers of the articles on health? If the educated middle class tended to read them then we can't say these literary efforts were trying to create a massive awareness on public health. In these articles, we have noticed how the authors protested against the government which were filled with the jerk of nationalism, but very few wrote on mass education which is the essence of keeping good health.

Secondly, perhaps the authors did not highlight the necessity to impose firm legal obligations on people to prevent the epidemics in colonial Bengal. Rather the appeal to the government was moderate or the writers spent time on self-criticisms. It seems like that most of the articles were an example of exhibiting the scholarly attributions, far away to prove its worth from the colonial standpoint. Very few attempts were noticed to address the commoners and these literary pieces could never be considered as serious endeavours to grab the attention of the government for initiating preventions.

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The journals like Tattvabodhini Patrika also published articles on health. But those writings did not reflect any plea for imposing public health acts. In the above-mentioned journal mostly, we have seen the writings on Āyurveda or some translations from the English works. As for instance in 1833 AD Tattvabodhini Patrika published an article on '*The dental treatment of the elephants'* by Atasi Devi [11]. Another article was published describing the goodness of having fruits. It was printed in the year 1834 AD [12].

5. HISTORICIZING THE WRITINGS ON PUBLIC HEALTH- A CASE STUDY BASED ON THE JOURNAL '*SWASTHYA SAMACHAR'*

Now I would like to mention the excerpts of three selected articles from the health journal, *Swasthya Samachar* and will assess their significance. I begin with an article namely, 'Banglar *Swasthya Sambad*' by an anonymous author, who stated- "*We don't have any system of our own for registering birth and death rates. Therefore, whatever the information we got from the government we had to rely on it. These information were collected from the rural illiterate policemen or the chowkidars. It is fruitless to argue about the authenticity of these facts[13]."*

In another article published in the same health journal, Dr. M.A Ansari stated, *"We spend 60% of the total revenue for military expenditures. But it would be futile to invest money for protecting the country when the health of the nation is in a nuisance condition …The best remedy to save the country is to solve the health problems of the population [14]."*

The third article was written by Sri Shrish Chandra Goswami. The title of the article is 'ghanta bandhibe ke? {who will bell (the cat)?}' Here he opined that, "The *spread of the English education has created a distinction between the literate and illiterate, that has to be eradicated...kindness can reduce the feeling of hatred, villages are the most peaceful places for dwelling where people get the mental peace or the food for thoughts [15]."*

The first article which I have chosen, criticized the government but did not suggest any solution. The second piece of literature though mentioned about the health problems of the nation, but how to eradicate those anomalies were not pointed out. In the third article, the author opposed western education, but he had no answers for how to build a cordial relationship between the literate and illiterate and how the villages could offer food for thoughts.

6. RESTRUCTURING THOUGHTS: WELCOMING THE NEW INSIGHTS

From the above-mentioned discussions one can identify two streams of perceptions. Firstly, to highlight the indifference, inefficiency and the callousness of the British government in the light of the vernacular writings and the governmental documents/reports as mentioned in those pieces of writings. Secondly, the failure of the efforts of the government due to the opposition and unawareness of the indigenous people. It is rare to find out the writings on the government and the people, especially the communication regarding public health between

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the colonizers and the colonized and the probable outcomes if there were any. Now the question is, what was the reaction of the government after seeing the articles published in the health journals like *Chikitsak*, *Swasthya Samachar*, *Chikitsok o Samalochak* and others? The answer is perhaps not known. Secondly, it is needed to have more researches on the writings of Raja Digambar Mitter, Chunilal Bose and Acharya Prafulla Chandra Ray, and the other stalwarts of public health in colonial Bengal.

We need to find out the contributions of the Indian officials of the public health department like Atul Chandra Chatterjee, Baman Das Mukherjee to comprehend the health situation on the eve of independence. Not only that, what were the ideals of the government on sanitation? Why the reports of the sanitary commissioners were important? How far sanitation and epidemics are related - we are supposed to reconsider all of these facts. For this purpose, it is obvious to deconstruct the existing theories on the history of public health in colonial Bengal to welcome fresh insights.

It is also important to relate medical literature with spirituality to understand the phyco-social responses to public health. For example, in ' *Swasthya'* (3rd Volume, 11th Edition, Chaitra, 1306 BS, pp-351-354) an article was published with the title of '*Plague o Samkirtan.'* In this article, the author described the virulence of plague in 19th century Bengal and also highlighted how the chanting of the name of Lord Hari or Krishna would eradicate the fear of the mind regarding the epidemic or the '*mahamari'*.

It was stated by the author-

"*Since the last three years Plague has entered in Calcutta. When it gets lethal, we are compelled to address God. Last year when Plague became deadly, people started to perform samkirtan (worshipping God through songs accompanied by dance, an act by the disciples of a particular religious sect, here the Vaishnavs) in a great extent. Samkirtan usually ends with the remission of Plague. This year Plague has taken a terminal shape and again the mass are getting attracted towards samkirtan. Every day the mob from the different localities are coming out on the streets and performing samkirtan. Hundreds of people in groups are getting assembled at the various places and by chanting harinam (the name of Lord Hari, Krishna) creating an aura of splendor for both the audience and the listeners. The Muslims in a large number are also participating in these naam kirtan (chanting the name of God through devotional songs) [16].*"

From this above-mentioned passage it is evident that, how people irrespective of their ethnic identities, engrossed in spirituality during the time of plague where we find an inclusive approach to the cultural plurality. Here '*Hari*' was not an emblem of a particular sect, rather his presence was omnipotence. This universal manifestation of '*Hari'* through music or samkirtan got a holy appreciativeness amongst the devotees. The adherents used to believe that, through the chanting of the names of God they would be saved from the grasps of the

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ailment plague as their strength of mind could help them to overcome their physical and mental sufferings [17].

The above-mentioned article was an important piece on how the natives tried to calm their mind during the epidemics. It talked on the mental health issues where spirituality acted like an allegory. This article was on spirituality indeed, but it did not preach any religion. From this particular perspective it seeks appreciation. We expect this kind of writings even now as they are inspiring [18].

The medical literature also mentioned the intense social issues like infertility and the approach was in most cases scientific. The indigenous literature of the colonial period indicates that the position of barren women in the society was low as they always suffered from the mental agony of being childless. They wanted to compensate the loss by showing their love and affection to other's children. But the general authors remained silent on the social humiliations faced by the barren women. The authors of the books or journals on medical science or were more vocal on this issue. They argued that male infertility was very common during that period and it would be a fallacy to blame only women for childlessness. Here also one can find different opinions, but the majority of them believed in the occurrence of infertility both in males and females. The question of gender neutrality somehow finds a room here as physicians acknowledged the fact of male infertility in the shape of the '*Bondhyo purush'[19]*.

The official documents or report can provide us an ample opportunity to explore the scope of medical literature with a qualitative approach. For example, the first report of the Sanitary Commissioner of Bengal was written in 1868 and was published in 1869 by William Jones [20]. This report was authored by Dr. David. B. Smith, Sanitary Commissioner for Bengal. It was clearly mentioned by him-

"…-The report is of great length; yet I venture to state that nothing is now submitted to the Government which is not of real practical importance in its bearings on the welfare of the people of this country.

It is impossible within narrow limits truly to represent the physical condition of thirty millions of human beings whose sanitary interests involve questions of very wide scientific range.

…A mass of authentic and sound scientific evidence has been collected on subjects of medical topography, prevailing causes of sickness and death, climatology, local causes of malaria, conservancy, water-supply, pilgrimage and epidemics which is well worthy of permanent record.

I am aware that this evidence is not so precise or in some respects so satisfactory as could be wished; yet it is undoubtedly of much value, as showing what exists at present, and what is wanted in the future [21]."

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The above –mentioned passage clearly indicates that how the official reports could be extremely useful to sense the necessities of better public health conditions during the British period and this kind of medical literature also helps us to understand the mentality of the colonial masters. It may be quoted from the same report that-

"As a result of the recommendations of the Royal Commission appointed to enquire into the sanitary state of the Army in India, in May 1859, the Sanitary Commission of Bengal was instituted in 1864[22]."

This statement exposed the truth that the concern for sanitary reforms originated from the interests to safeguard the British Army in India. There was no genuine empathy to protect the natives from the clutches of various ailments, rather the health-related matters were more '*official*' than '*public*' and it would be more historical if we can initially use the term 'Army health' instead of 'public health' to establish our arguments on the history of maladies and epidemics in colonial India.

7. CONCLUSION

Finally, we need to theorize or conceptualize the motives behind each of the literary pieces and to trace hidden desires of winning over the situation where the power of expression or language played a pivotal role. Here we can apply hermeneutic approach to unearth the secrets of explaining human emotions in a right way. Like Derrida, we need to deconstruct the literary texts to indulge criticalities and problematic to discover new avenues in the social history of colonial Bengal from the lenses of medical literature as words are highly 'political' and the cascade of words is not always anecdotal. The politics of words can decode the social behavior which is the essence of any kind of historical understanding.

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HISTORY OF SOCIAL WORK EDUCATION IN INDIA: KEY TO GLORIOUS FUTURE

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ABSTRACT

Indian Higher Education is the second largest in the world. Education carves the future of a nation and thus it becomes imperative to understand its evolution and the direction of its movement. The paper presents the history of higher education and attempts to understand Historical evolution of Social Work in India with a special emphasis on education. It focuses on the journey of Social Work education in India and associates it with the present challenges. It is based on secondary sources and utilizes systematic literature review for meeting the objective. There are functional problems in Social Work practice and education which are pointed in the paper. Also, the complex interplay of various factors that act as impediments in Social Work Education and Practice are identified and presented. The systematic review can be utilized for the purpose of enhancement of the education and practice of social work and policy level interventions can be made. The paper also provokes the thinkers in social work to work on alternative and effective means for practical components of social work.

Keywords. *Social Work Education, Evolution, Challenges, Opportunities*

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1. INTRODUCTION

Education is the key element shaping the citizens of tomorrow. Plato considered education as a life-long process starting from the initial years of childhood to the very end of one's life in order to pursue the ideal perfection of citizenship, he furthers that education teaches how rightly to rule and how to obey. Indian perspective of education emphasizes on spirituality. In the words of the philosopher Shankaracharya, "Education is the realization of the self and it leads to salvation". Rabindra Nath Tagore explains education as, that which empowers the mind to search that ultimate truth which liberates us from the bondage of dust and gives us the wealth; not of possessions but of inner light, not of dominion but of love, constructing this truth its own and gives expression to. Every definition somewhere tries to justify the objectives of education.

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In order to comprehend social work education, it is first essential to know the concept of Social Work as a defined by scholars so as to develop an understanding of it as a discipline and as a practice profession.

According to Friedlander (1964), "Social work seeks to assist individuals, groups and communities to reach the highest possible degree of social, mental, and psychological well-being. Its function requires awareness of the dynamic interplay of personal, biological, and psychological elements within the socio-economic forces of the environment of human beings [1]."

Right from the very beginning field work has been of prime importance in social work. It is the core strength of social work curriculum.

2. SOCIAL WORK EDUCATION AND PRACTICE IN INDIA: THE PAST

From philanthropy to profession, Social Work in India has evolved gradually over years. Though the notion of Social Work is as old as mankind, most historians believe that as a professional concept Social Work got recognition only in the 19th century. Social Work being a faculty of recent origin is reported of specific challenges as well. Social Work Practice in India was introduced by the Americans in 1930s, where they were eager to share their new fruitful treatment methods and Indians started adopting the American model of Social Work Education. With time, this model has been to a certain extent customized to Indian needs, where regular students in India are exposed to field via concurrent field work practice (normally 2 days a week) and other practical components that are also taught in theory classes. This combined model is the ideal approach [2].

2.1 Social Work in Ancient India

Nature of social service was charity. Social welfare activities were performed by means of Yagnas; most popular mass-rituals known in Vedic times. Privileged class had the duty to serve the poor, not to show superiority but in order to get Moksha. The duties were only defined as per religion in the Vedic times, there was no provision of adjudication. However, caste system that sprung towards late Vedic era posed serious threat to the state of welfare. Buddhism also accepted the karma theory and promoted giving 'bhiksha' to the 'bhikshus' residing in 'sangha'. It was Ashoka who developed a comprehensive system of social welfare, including women's welfare, rural development, rehabilitation of poor, and regulation of prostitution and provision of public utilities [3].

2.2 Social Welfare during the Sultanate

The sultanate was an Islamic state. The King had to maintain peace, protect the kingdom against external attacks, levy and realize taxes and provide justice to the masses. Certain towns like Delhi, Lahore, Panipat, Kol etc. became the loci of welfare. Hospitals, Madarsas, Mosques, Granaries, jamaitkhanas etc, were well established in these centres. Caste cities got

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developed as cosmopolitan urban centres. This era is also pointed with stagnation of science, growth of orthodoxy, deep hierarchical order. The social mobility among different groups was yet prohibited, and important roles were confined to certain castes and classes [4].

2.3 Social Welfare during the Mughal Rule

Humayun despite a muslim ruler, made a bold attempt to prohibit Sati system. The most notable ruler of Mughal kingdom was Akbar who abolished slavery in 1583 and introduced equality including freedom of religion to his subjects. 4 categories – 1. Seekers of true knowledge, 2. Devout persons, 3. Destitutes, 4. Person of noble lineage who would not 'out of ignorance' take employment were eligible claimants for availing grants. However, the institutions responsible for redistribution of wealth downwards soon got corrupted and the only means of relief got limited to free kitchens – langars [5].

2.4 Modern Social Work

The modern era can be further understood in three time zones - Pre-British, British and Post-British times. In Pre-British times Indians followed the system of joint family, village community and village temple. British rule inspired social reform and Christian missionaries worked for education, equality, health etc. which later became the grounds of emancipation and social evils and practices were attacked. The foundation of modern social work was laid by Christian Missionaries in 19th century. Orphanages, Hospitals, and Schools were established, and certain legislative measures were also adopted by British rulers. However, the year 1936 marks the golden beginning of Social Work Education in India when Sir Dorabji Tata Graduate School of Social Work got established in Bombay and formal training began.

After Independence, social welfare provisions were well defined in Indian constitution. However, as the practice of social work got adopted from the west, indigenous literature, superstitious cultural ethos, multiplying responsibilities, varied a dynamic normative and pragmatic dimension, close ties with welfare state and missing ethical framework pose serious challenge to social work education and practice. The old social movements that are primarily economic in nature and the new social movements focusing on cultural creativity, autonomy and capacity to act on all aspects of human experience, are connected to the changes in social work. It becomes imperative to understand that social work in India has not grown in isolation but within a complex, diverse and dynamic framework which poses challenges as well as opportunities [6].

3. SOCIAL WORK EDUCATION AND PRACTICE: THE PRESENT

Though quantitatively expanded well, research suggests that the Higher Education system in India itself suffers from certain lacunas irrespective of the disciplines concerned.

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Research studies have reported that higher education in India had expanded only in quantity and not quality [7], [8], [9]. India's higher education is bureaucratically inflexible, governed by poor structures and uneven and modest quality at best. Even the regulatory and accreditation mechanisms and processes to assure quality are highly perplexing [10].

It was inferred that the problems of Indian Higher Education are deep rooted and arise out of a range of dilemmas like historical constitution of Indian higher education, organizational culture and attitudes that people hold due to the nature and functions in society itself [11]. The accreditation process of colleges and universities must shift from inputs and processes to outcomes and results for quality assurance. It was furthered that the best and brightest must be attracted to the teaching profession to assure best quality education [12]. There is a felt urge to establish an accountable system of quality in higher education where every stakeholder needs to be recognized, studied, employed and supported to the full extent [13].

Shri M. Venkaiah Naidu in his address acknowledged that professional education suffers from shortage of qualified staff, insufficient infrastructure, and is not aligned as per global demands. Also, there is no system to ensure accountability and performance of teachers. He also expressed his concern on tapping 65% of the population which is below 35 years of age [14].

The flaws in Indian higher education are also reflected in Social Work education. Where on one hand the discipline is of recent origin and adopted from the west, the current framework also poses numerous challenges in front of social workers.

Social work education needs to be a perfect blend of theory and practice. However, when it comes to the Indian context, limited indigenous social work literature and non-involvement of practice teachers in the process of grading pose serious limitations to social work education [15]. It has also been pointed that the major shortcoming of social work education in India is its inability to sufficiently indigenize its knowledge base. The basic teaching material with respect to interventionist methods (the holy trinity of social case work, social group work and community organisation) is still primarily American [16].

Apart from this, it was pointed that the student teacher ratio in most programmes of social work is ideal which helps the students to interact with the faculties well, however, the quality of faculty, and the missing link between industry demands and academic curriculum is a major obstacle in developing social work. It was suggested that there should be strong link between alumni and educational institutions. Also, alumni from their practice environment should contribute in updating the teaching curriculum focusing on the skills and knowledge aimed for in the employment market. One year specialization is yet a mockery of the course and absolutely specialized courses should be started by the schools of social work and degree in social work should be more generic in nature with a strong focus on social work theory and practice. The programmes in social work that offer certain specializations don't guarantee that upon employment the learner will specifically enter into the same field. Also, it was

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pointed that most programmes are shifting towards the business orientation and money making avenues and soon it would be education that would take the shape of business. His observations and predictions are somewhat turning true today [17].

Society expects that social workers should be dedicated to the pursuit of social justice, the enrichment of the quality of life, and the development of the full potential of each individual, group, and community in the society. Yet, it is important to realize that the term 'Professional Social Worker' is applied only to full time experts who have had received their training at recognized higher educational institutions and have qualified themselves through examinations. It has been an obvious observation that with the numerous organizations recruiting Non-MSWs as Social Workers and at other allied positions and other challenges of educating, recognition, and the like, professionalization in Social Work has time and again put to question. Today, Social Work is not just a regular full-time course but is also offered at distance mode through open and distance learning, and in a way is coming within the reach of all aspirants. However, the aspirations of the students studying in the urban areas mostly get curtailed to finding a job in the urban areas [18].

Today, Social Work is essentially in a real challenging and ambiguous position. It must move beyond the restrictions to rediscover ambiguity and uncertainty in terms of set of factors (including risk factors), which drive human cognition, motivation and behaviour. For a better future, focus on removing impediments and improving higher education is a must. There had also been dilemma about what would be the exact form and purpose of Code of Ethics in a heterogeneous society like India, which remains unresolved [19]. Research suggests that better resources, networking, exposure and inclination towards experiential learning will enhance the quality of education in social work. Also, continuous monitoring and enhancement is needed to improve quality which will also result in changed perception of social work as a discipline and profession [20].

The recent COVID-19 pandemic has posed yet other serious threats to the practice-based disciplines. On one hand, minimal Government interventions do imply the need for social work in contemporary times, yet, on the other, training social workers in a blended mode with field work practices and other practical components happening in online mode marks a serious question to the understanding of practical aspects itself.

The road to excellence is often difficult but definitely full of opportunities. It is true that social work in modern times has many challenges ahead, yet, like Thomas S. Monson rightly said, 'Our most significant opportunities will be found in times of greatest challenges', these challenges do present significant opportunities for growth and change.

4. EXEMPLIFYING SOCIAL WORK EDUCATION

Despite of the challenges Social Work Education has materialised in concrete form. Though limited in count, the work of some of the social workers is significantly noted.

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TISS is the pioneer institution in social work and has produced alumni like – Ms. Medha Patkar, a social activist who need no introduction. Her work in Narmada Bachao Andolan and interventions in the issues of tribals, dalits, farmers, labours speak for itself. She founded National Alliance of People's Movement. She also was a commissioner to World Commission on Dams. Another person of significance from the school of social work is Ms. Poornima Mane, an expert on sexual and reproductive health, former President and CEO, Pathfinder International. She has also been associated with UN in the capacity of United Nations Assistant Secretary-General and UNFPA Deputy Executive Director (Programme); World Heath Organization and UNAIDS.

The second school of social work – School of Social Work, Delhi University, has to its credit famous personalities like Mr. Feisal Alkazi, Founder of Ankur, a society for alternatives in education, is also an educationist teaching students at Jamia. He is also a theatre director and activist, with over 20 books to his credit and over 200 plays directed by his group 'Ruchika'.

Professor Manoj Jha, another notable product of School of Social Work, Delhi University, has been rendering his services as Professor, Social Work, Delhi University and is also a member of Rajya Sabha. Also, he is the spokesperson of the Rashtriya Janta Dal.

Not just in practice and activism, social workers have also contributed to social work education. Prof. Gracious Thomas, B.A., M.A., Ph.D. and D. Litt in Social Work is the founder Director of School of Social Work at IGNOU, New Delhi. Highly experienced in academics and research he has made valuable contributions to Higher Education (Open and Distant Learning (ODL)) particularly in Indian context.

However gloomy it may appear, prominent social workers have always proved that nothing is impossible and where there is a will, there certainly will be a way.

5. CONCLUSION

Social work as a discipline though is of recent origin and has a long journey ahead suffers from the basic impediments of Indian higher education and other specific issues. Some of them are imposed by structures and functions of the society itself, while there are others that have developed with time. Definitely some factors are beyond control, like the recent effects of COVID-19 on education, yet alternatives need to be meticulously and uniformly worked on in order to cope up with the challenges posed by time.

In order to write the glorious future of social work education and practice, subsequent revisions and changes are needed in the discipline as well as in higher education system itself, which though worked upon are miniscule. Also, a robust selection of qualified teaching staff and training of the faculties, provision of licensing of practitioners, and integration of practice into theory for building knowledge base will promote better social work education and practice.

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RISE OF E-SPORTS

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ABSTRACT

Back 10 years ago Video Games was considered as one of the most distracting mode of Studies, Career extended to our life as it was bringing in loss of concentration from studies as well as aggressive behaviour among the individuals. However, times have changed and now video games are no longer considered as a distraction, rather it is now considered as the most life changing career we can ever imagine ranging from gaining reputation to building a long successful life as well as recognition among everyone around the world. However, choosing the career as a 'Gamer" isn't easy. Just like being a sportsperson or athlete takes a lot of effort and hard work, similarly, being a gamer requires our reflexes, our hand eye coordination as well as our mental capacity at its core to be so called as a professional gamer. Gaming not only helps us escape from our real-world stress, but it gives us a sense of relaxation which comes in the form of interaction with random friends online to enjoying our time.

Keywords. *Career, Reputation, Gamer, Coordination, Interaction*

1. INTRODUCTION

E-sports is sports based on electronic based in the form of video games played via PCs, Laptops even consoles like Sony PlayStation, Microsoft X-Box etc. E-sports is now a worldwide trend that is going on around everywhere around most of the countries where competition is being portrayed by professional players coming from all around a world in a centralized location supported by gaming companies and franchisers. E-sports like any other sports requires skills and good reflexes that is needed to create an impression either on the eye of the pro league teams or in the eye of the gaming organisations. One of the prime examples of being a E-sports player is "Shroud" who is a pro league gamer once played for the pro league team named "Cloud 9".

2. HOW IT ALL BEGAN

E-sports first found its name back in 1972 where participants competed in the arcade game called Space war and the winner got a long-term subscription of magazine of the famous rock bank rolling stone. But it was later in 1980 that the biggest esports tournament was held

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attended by 10,000 audiences where the game Space invaders was played. On 1990 the rise of Nintendo gaming started taking place with players competing in the game called quake which is still played now. Fast forward to 2000s where now more than 100 gaming tournaments are held ranging from FPS games to RPG games and much more and this kind of games are now being live telecasted with the help of YouTube and Twitch.

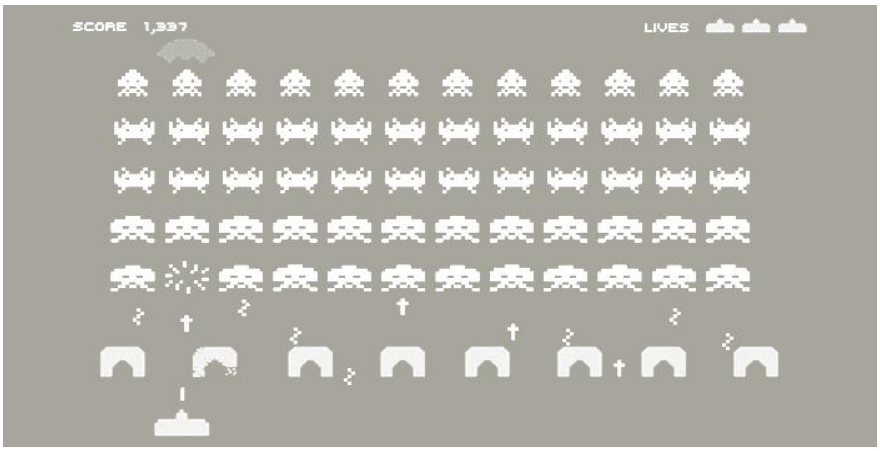

Fig. 1 Snapshot of Space War Back In 1972

Source: Bountie Gaming, Medium.com, 3rd Jan, 2018

3. MARKETING ANALYSIS ON E-SPORTS

Since our childhood we have been playing video games from Gameboy to Nintendo and now to next generation consoles like Xbox and PlayStation, but have we ever thought about a career on it? It sounded absurd but now E-sports is in such a position that big companies want their Marketing Team to focus on E-sports companies like Logitech, Samsung, Asus etc. on July 19th, 2019, A US Teenager of 16 year old won a World Championship Tournament of Fortnite where he won $3 Million which grabbed the attention of a lot of recognised news channel like BBC and Fox news along with main stream media as well as magazines like Wired and digit as a part of promotional Marketing Mix on E-Sports. Logitech ever since they started collaborating with E-sports gained $161 million out of their total $720 million on 2020 with 22% of their total sales and a net income of almost $73 Million.

Some of Big Marketing Strategies are as follows:

- LG and Valorant hosting Valorant Tournaments for Indian Gaming community with a chance to win a huge sum of amount around 2 or 3 lakh rupees.

- Coca Cola with Riot Games Collaborating to Promote E-Sports on League of Legends World Championship Series with League of legends characters being portrayed in their Coke Zero Cans.

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- Airtel Partnering with Nordwin Gaming of Indian E-Sports to expose the potential of young Indian talents on E-sports.

4. LITERATURE REVIEW

4.1 How Does E-sports Benefits Us

4.1.1 Hand Eye Coordination

As we have seen in sports like football or baseball even in cricket the players have perfect combination of their eyes and their hands in order to either catch the ball, save the ball or hit the ball with the bat which cannot be done without proper training. Similarly, E-sports requires a proper tracking of our eyes along with the movement of our in-game character by keyboard or with a controller. Not only it benefits players on becoming better, but also it helps us in real life on tackling multiple tasks at once. The one benefit of E-sports is that we can practice with the help of aimbot training applications or directly in game whereas in physical sports the only form of practice is in nets on the eyes of the coach.

Fig. 2 Snapshot of Aim Lab Trainer for Improving in Hand Eye Coordination

Source: Steam, 7th February 2018

4.1.2 Own Utopia

Our Lives aren't as simple and easy as the rich people, people with crippling anxiety or depression tends to lose interest and mood from certain things. Gaming and its community help this kind of people to engage in certain activities which lets them have fun and enjoy their time in on online environment surrounded by people around the world who comes together. When someone is engaged in gaming, they tend to spend hours on it without

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worrying about anything else which keeps their mind distracted from real life worries and stress.

4.1.3 Recognition

Various games have access to competitiveness mode where the stakes are high and people with much better skills comes to play which is termed as rank mode. This rank mode gives the players an opportunity to test someone's skills and ability on how they play it. When someone with extraordinary skills portrays their talent On Live stream like on YouTube or twitch, catches the attention of some of the members that belongs to a pro league team and gives that person a chance to be part of their team and play for team on international level that not only gives them chances to improve but that person will be recognised around the world just like when someone gets a contract to play for a football team like Barcelona or Bayern Munich.

Fig.3 Content Creator Tfue getting Faze Contract

Source: James hale, Tube filter Article, 20th May 2019

4.2 Emerging Trends of E-Sports

We have been playing games all our lives from consoles that used to cost around $15-$20 to buying consoles of $300-$500 with added new features and peripherals but why do we buy it? As a part of young Generation is it hard to find certain interest that suits our calibre. E-sports provides an opportunity to this young generation to reveal their skills and talent on E-sports something which they are unable to showcase due to lack of opportunities on their individual countries.

As time progress, new features get added and adapted and this youth knows exactly how to adapt and cope to changes around them and not afraid to try new things similarly, in E-Sports the competition is always high and that's exactly how this youths uses that high heated

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tension to their advantage as a way to overcome their fear. New Marketing Management gives this companies opportunity to diversify their brand recognition with collaboration from gaming industries giving them a head start of their competitors and this youths actually go to an extent to purchase their gaming products to show their love towards E-Sports. More recently people have been started to Invest in the Professional E-Sports team Fnatic to become a member of their team or to apply for a role as marketer or HR for this pro league teams to show their interest.

5. WHY CHOOSE E-SPORTS AS CAREER?

5.1 Self-Employment

One who chooses to be a gamer has an option to either Stream their gameplay or make content videos to be added on YouTube in order to gain subscriber and views for monetisation. In both cases its worth a lot of money at our own comfort as all we need is a good gaming device, a camera and some editing tools to start. Grinding for views and followers gives this people a chance to earn in order to live their life.

At present time, when unemployment is at huge numbers and athletes not getting enough chances to compete, they are slowly moving towards content creation and gaming which is earning them money in huge amount which also comes with recognition.

Athletes like Virat Kohli, Leonel Messi, even Hollywood superstars like Henry Cavill started streaming their gameplays as a second profession.

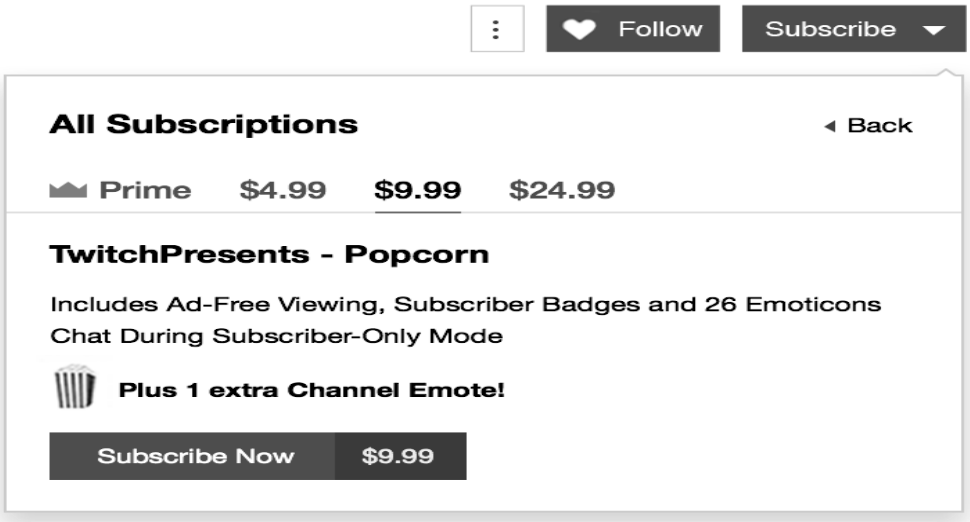

Fig. 4 Twitch Subscription Prices As Means of Getting Paid

Source : Twitch Official Site

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5.2 *Franchisers, Merchandises and Partnerships*

When someone possess some remarkable skills in gaming while also being a good content creator, Some Brands and companies like Ubisoft, EA, even Samsung collaborates with that certain person to launch products with their names or their logo on it which not only promotes that brand but also the revenue earned from it goes to them in certain amount. Games like Rainbow Six Siege or Counter Strike has in game collectibles of professional players and content creators that is hand made by them. Not only that but certain Gaming Stores like Digital Storm gives away Free gaming PCs to content creators and professional gamers who are under the contract of a professional team.

Fig. 5 Logitech Collab with Professional Player Shroud

Source: Essentially sports by shwetang parthsarhy, 16th September 2020

6. TOURNAMENT OPPORTUNITIES

Just like Various sports conduct different tournaments where players gets a chance to showcase their talent in order to get a chance to be a part of a bigger team like cricket having IPL and football having Champions league, Similarly there are gaming tournaments like Gamer Connect tournaments hosted by NVIDIA which is free for all, LG WD Black tournaments that gives players a bigger chance to play on a much bigger tournament played by professional players. This Tournaments gives huge amount of profit as winning price that goes up from thousands of dollars to millions of dollars some of which goes towards charity so not only it promotes the players but helps the economy as well.

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Fig. 6 Twitch Rivals Call of Duty Warzone Tournament

Source: Game byte blog by Lara Jackson, 23rd march, 2020

7. DATA PRESENTATION OF E-SPORTS

Logitech

Logitech which is as equal as Microsoft in terms of proving the perfect PC peripherals has gained total of 17% total share growth on 2020 from 9% on 2019. They gained $297 Million from USA as revenue, $232 from Europe and $191 from Asia-Pacific all on 2020 so far compared to $690 Million on 2019.

SONY

Sony raised a total annual profit of $6.7 billion on 2020 out of which July-September itself raised It to $3.2 Billion out of $6.7 Billion because of their pre orders of PlayStation 5, PS plus subscription and newly added PS4 Games as a result they purchased Crunchyroll, an animated web series platform company for a billion dollars and invested an amount of $64 Billion for which they expect a return of $640 Billion.

Microsoft

Microsoft recorded a 64% growth in revenue in the fourth quarter of 2019 for which it got an annual of $1.2 Billion or 65% as a result of people staying home due to covid-19. Their New launch of Xbox Series X and Series S gave them a boost of extra 49% Revenue on their pre orders and launch.

8. HOW IT HELPS THE ECONOMY

Charity for Underprivileged

While Taking part in some major tournaments, The E-sports players not only get rewarded with trophies, but the prize money that they receive, 10 percent of It goes into

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the charity or donation to autism centres, orphanages as well as some non-profit making organisations. Not only it raises the recognition of that particular gaming community, but these tournaments are held every month raising more and more money for CSR works that they take part in. Moreover, the money raised from subscriptions and views, the streamer decides to either keep it or donate it for charity when the event calls for. On March 25th, 2020, A professional player and streamer named Ninja donated $150,000 on a charity called "Feeding America" to help relieve those affected by the coronavirus outbreak.

Game Stores

As the Trend for gaming moves up and celebrities and athletes are following the footsteps on being gamers, gaming is now a major trend which is a great opportunity for local people to start a game business by opening up stores that sells gaming products, consoles and hard copy games on a price that everyone can afford thereby making a good profit out of it. One prime example of such is the store called "GameStop" which has over 700 stores around USA that sells games, gaming products and consoles.

Fig. 7 Games the Shop Store in Mumbai, Maharashtra

Source: Games The Shop, Infinity Mall Official Website, 14th October, 2020

CSR Projects by the Gaming Companies

It has been only known that tech companies like Apple, Microsoft etc are known to give a lot to work for the Non-profit making organisation to increase their social responsibility, But recently it has been the gaming companies like Ubisoft and EA who has also been doing a lot of CSR works to not only increase the social corporate responsibility but to also use their revenue for a good cause towards the environment. Recently Ubisoft

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worked with UNESCO on preserving and renovating the Notre dame in Paris that got engulfed in fire by providing them the accurate and clear blueprint of both inside and outside of the Notre Dame that was clearly portrayed in their game "Assassins Creed Unity".

9. LIMITATIONS

Wrong Decision: Just because we look at other play doesn't mean it's the same kind of interest that we will get too and end up choosing the E-sports career where our skills are of no match to others in a particular game. To be in a Professional team you have to be committed to one game and cannot switch between. A Person expert in League of Legends cannot be allowed to compete in CS.

Costly Leap of Faith: Just because there is a professional team that doesn't mean it's a good one there are E-Sports team who are always at last or who's revenue is not high. If you're a content creator for YouTube or twitch, whatever you earn from there half of it will be taken away by the E-Sports team as part of your contract with them so for that reason its okay to be an individual rather than a team player.

Skills Mismanagement: When we work for a certain organisation we are expected to be employed for a certain set of skills even if we don't have it similarly to be in an E-Sports team its vital to have the maximum skills on almost Both consoles and PC along with accurate aim and game knowledge where we go lacking In and takes time to develop as a result we will fall back of others and ultimately may lose our contract due to mismanagement of skills.

10. THE EVOLUTION (THEN VS NOW)

As we move ahead, we can now enjoy any game we want back at home, show our skills and get a chance to be in a bigger picture by streaming or making videos of our talents in gaming. From waiting hours in queue in the arcade store and game centres, we can save time and play any game we want by just having a Console, Pc or Laptop which wasn't possible back during 1972.

As time moves ahead, Universities around the world are using VR games as means of graduation ceremony during this time of pandemic when social distancing is a necessity. Furthermore, more gaming tournaments and companies are being launched with new streaming services in Facebook and Microsoft Mixer allowing more players to showcase their game and earn online. A similar case happened when the mobile game PUBG got huge recognition and player activity in India as a result thousands of tournaments got held even by certain Universities and Schools. The government are now planning to fund for such gaming providing training and salaries to play games and bring in annual return.

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Fig. 8 IIT Bombay VR graduation Ceremony

Source: Interesting Engineering article by Deniz Yilmaz, 25th august, 2020

11. CONCLUSION

Though back in 2010 people used to laugh at others who chose gaming and esports as their career as the only job back then were either be in IT, be a doctor or an engineer. With growing time that seemed to change as Technology bought online community and gamers together to not only be a part of a bigger picture but earn through online mode that requires much higher skills and knowledge against equally knowledgeable and skilled E-sports players. Though being a gamer means a lot of funding in terms of purchasing a good system that can run most games, but the reward afterwards is a lot satisfying when those skills are being put to good use and being paid off.

Maybe in the next 10- or 20-years E-sports may lose its touch, but it will be marked in history as the most accomplished way of paying off your debts.

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MIMICRY AND THE OTHER: A STUDY OF THE IMMIGRATION EXPERIENCE IN THE INHERITANCE OF LOSS AND AMERICANAH

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ABSTRACT

Immigration as a phenomenon brings along with itself the complexities of social, political, economic, and demographic changes both in the country being emigrated from and the country being immigrated to. The colonial, as well as the post-colonial era, saw the immigration of people from the colonies and erstwhile colonies to the West, mainly the United Kingdom and the United States in search of better prospects and higher standards of living. For the immigrants, however, the issues of experiencing an identity flux, suffering the trauma of existing peripherally in a foreign country, facing racial segregation and a constant search for acceptance become formidable and often insurmountable difficulties in their struggle for establishing a life of stability. This research article thus seeks to examine the immigration experiences of the characters as presented in Chimamanda Ngozi Adichie's Americanah and Kiran Desai's The Inheritance of Loss. Further, it makes a comparative study of the African and Indian immigrant experience using the post-colonial tenet of 'otherness' and Homi K. Bhabha's concept of mimicry and therefore aims at delineating the differences while underlining the essential sameness of these experiences.

Keywords. *immigration, mimicry, otherness, colonialism, post-colonialism*

A crucial aspect of the study of texts which are post-colonial in their theme becomes the exploration of the ideas of the 'other' and of 'mimicry'. The tendency to mimic the white man after realizing the undesirability of their status as the other is especially seen among Asians, Africans, and even Latin Americans who immigrate to the United Kingdom or the United States of America in search of better prospects, albeit a better life. Kiran Desai in The Inheritance of Loss and Chimamanda Ngozi Adichie in Americanah though have written about experiences spatially, culturally and socially differentiated have however succeeded in speaking about them in a way which has curiously united them in their similarities. A comparative study of the African immigrant experience as presented by Adichie in Americanah and of the Indian immigrant experience as presented by Desai in The Inheritance of Loss would evince the apparent differences but also the inherent similarities as the characters in the novels struggle to find themselves in their quest to other lands and in their inevitable homecoming.

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The other in post-colonial theory is used to refer to the colonized subject who has been marginalized and "…characterized as the 'other' through discourses such as primitivism, and cannibalism as a means of establishing the binary separation of the colonizer and the colonized…" (Ashcroft et al. OTHER). Therefore, the idea of the other for the colonizer is the colonized subject who is everything that the colonizer is not. Connected therefore to the idea of the 'other' is the idea of mimicry. Homi K. Bhabha in his essay Of Mimicry and Man: The Ambivalence of Colonial Discourse purports the idea that the colonizer creates a milieu of colonized people who would resemble the colonizer and make their purposes of domination and subjugation easier. The colonizer intends to make the other more like himself, but he does so in a way which still maintains the difference between himself and the other. For Bhabha "…colonial mimicry is the desire for a reformed, recognizable Other, as a subject of a difference that is almost the same but not quite." (126) This attempt at a mimicry also provides an opportunity for the other to behave more like the colonizer. For the colonized, mimicry becomes an effort at appropriating a part of the power of the colonizer but there remains a persistent gap between what they are and what they desire to be.

In both Americanah and The Inheritance of Loss the attempts at mimicry after realizing their position as the other in the perception of the white man is seen mainly in the characters of Ifemelu, the Judge- Jemubhai Patel, while in Obinze and Biju their knowledge of themselves as the other prevent them from committing a blind mimicry of the white man. All of these characters travel to the land of the white man and come back as individuals reformed and redefined by their experiences. In The Inheritance of Loss, Desai places Jemubhai Patel in Kalimpong during the Gorkhaland Movement and shows how the Judge though present in the 1980s in India is almost always absent from his immediate reality. Sent to England to study at Cambridge and to become a member of the ICS when India was still a colony, all that Jemubhai gains in his time spent abroad is the awareness of his inferiority as the other. He grew contemptuous of himself and started viewing himself the way the colonizer views his subjects. He internalized their discrimination and became a foreigner to himself.

To Jemubhai everything about himself turned odd and disgusting. His features which differentiated him from the white man- his skin colour, his accent even his smile became a reminder of the revulsion that the white man harboured for him. He started washing himself obsessively to clean himself of his otherness and began hiding behind his clothes and shadows lest he might offend the sensibilities of the white man. The alienation that he faced made him believe that he was afflicted by nothing less than plain "hideousness" (Desai ch.8). He grew distant from his immediate surroundings and Desai remarks that "He retreated into a solitude that grew in weight day by day. The solitude became a habit, the habit became the man, and it crushed him into a shadow." (ch.8), as he tried to become a non-entity, glossing over life by being as less of a visual disruption to the white man as possible. When Desai says, "He had learned to take refuge in the third person and to keep everyone at bay, to keep even himself away from himself like the Queen." (ch.18), the chasm that had formed between him and his identity gets delineated. By referring to himself in the third person he had

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managed to disassociate from himself completely, having tried hard to wipe out his identity of that of the other.

After returning from England, he tries to mimic the colonizer. The contempt which he developed for the people of his country only reflected the alienation he faced in the land of the colonizer. While his identity as the colonized inferior remained an unchangeable truth, his desire for abrogating that identity and to mimic the colonized to appropriate a part of the colonizer's power became the fiction that he aspired to. He started to impose on those around him a routine discipline which helped him to recreate the sense of authority and sovereignty that had been snatched away from him in his time spent abroad. Empowered by his white education and newfound position as a civil servant he made it a point to impose himself on those Indians who had hitherto declared themselves his superior by virtue of their class. This incipient desire to dominate and dictate indeed stemmed from the crippling awareness that he would never be the white man and that he would forever remain, "almost the same but not quite." (Bhabha126). To illustrate this Desai writes, "The tight calendar calmed him, as did the constant exertion of his authority. How he relished his power over the classes that had kept his family pinned under their heels for centuries..." (ch.11) Even his treatment of his wife Nimi became an act of perverse revenge against his own otherness. He saw in Nimi that which he hated about himself- the impossibility of ever being white. Therefore, when Nimi refused to learn English and by doing so resisted the Judge's efforts at making her anglicized and made a mistake in her speech, the Judge physically abused her, and by doing so tried to beat out of her the disgust that he felt for his race. In fact, the Judge subjected Gyan, his granddaughter's tutor to a similar humiliation that he had experienced at Cambridge to recreate the scene which had made him feel helpless as the other but reenacting which made him gain a sense of kinship with the colonizer. He asked Gyan to recite a poem, just the way he had been asked to during his ICS exam and after Gyan had completed reciting his poem "The judge began to laugh in a cheerless and horrible manner." (Desai ch.18) just the way his examiner had chuckled after he had completed reciting Lochinvar. He chose to reside in Cho Oyu, a bungalow bought from a Scotsman and feasted on the delicacies of the English cuisine, trying to obliterate from his memory his Gujerati origin and palate. He tried to live a life mimicking as closely as possible the life of the white man, but crumbling much like Cho Oyu, under the knowledge and memory of his own lowliness.

Ifemelu, on the other hand, a young Nigerian who moved to America in 1990s to study at Princeton, in Americanah has a different experience in her status as the other. For Nigerians devoid of a choice, migration to the land of the white man is the rite of passage one has to undergo before one is to experience the promise of a life of unquestioned security and prosperity. After moving to America, Ifemelu found herself longing for the real American life- a life full of wealth and stability. Living with her Aunty Uju, "She ached for the lives they showed, lives full of bliss, where all problems had sparkling solutions in shampoos and cars and packaged foods, and in her mind, they became the real America, the America she would only see when she moved to school in autumn." (Adichie ch.10)

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However, unlike the Judge, her education made her aware of the status of black people as the other in America and it also gave her the gumption to voice her views on the complexities of racial segregation in America. Constantly vigilant of the attempts at mimicry by herself and other Nigerians like herself, she eventually reconciled herself to her identity as a Nigerian. Her observation of the people around her made her aware of how Nigerians were only too eager to let go of their otherness to merge seamlessly with the American way of life. Her Aunty Uju she observed, pronounced her name as "…you-joo instead of oo-joo" (Adichie ch.9) and that her friend Ginika had metamorphosed into the average American youth, letting go completely of her Nigerian traits. It surprised Ifemelu to see, "…her (Ginika's) American accented words sailing out of her mouth and (she) was struck by how like her American friends Ginika has become" (Adichie. ch.12) It seemed to her that all races had become one amorphous amalgamation of the universal American identity with each one trying to mimic whiteness to the best of their abilities. At a party Ifemelu noticed how the Japanese, Chinese, Indian and Nigerians were "well-choreographed" (Adichie ch.12) as they "…laughed at the same things and said "Gross!" at the same things;" (Adichie ch.12).

Immediately after reaching America it was required for her to assume the identity of one Ngozi Okonkwo for her to work and sustain herself having to jettison immediately an important part of her identity- her name. Later in her relationship with her white boyfriend Curt, Ifemelu surreptitiously struggled to discern who she truly was. Even though Curt never willingly made her conscious about her otherness Ifemelu wondered whether she wanted to be authentically African American or that which the white American expected her to be. The only advice she was given before an interview for a job was to "Lose the braids and to straighten your (her) hair." (Adichie Ch.19). Ifemelu continued wearing her hair the way white people expected her, in order to be less of an aberration to the unaccustomed eye of the white man. Later however she would decide to wear her "thick, kinky, God-given halo of hair, the Afro." (Adichie ch.19) the way it was naturally supposed to be. She grew into her identity as the black woman and even tried to "…convince other black women about the benefits of wearing their hair natural" (Adichie ch.1).

This acceptance of the otherness of her physicality is in sharp contrast to the Judge's repeated efforts at decimating the physical attributes which made him the other. In fact, Ifemelu would also decide not to sound American anymore in order to distinguish herself as the other and to discontinue the mimicry which she deemed necessary for survival in the land of the white man. She had mastered her American accent but she realized that even though she had achieved what she had aspired for and had aced at mimicking the speech of the American, "…her triumph was full of air. Her fleeting victory had left in its wake a vast, echoing space, because she had taken on for too long, a pitch of voice and a way of being that was not hers. And so she …resolved to stop faking the American accent." (Adichie Ch.) She returned to Nigeria not because she was expected to, but because she wanted to, empowered by an epiphany about the worthiness of her own culture and country. Unlike the Judge, she did not return with an incapacitating self-loathing and scorn for her country and the people it housed

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but with a willingness to find her identity stripped off the pretentiousness and expectations associated with being the other.

The conundrum and disillusion associated with immigrating to another country are also seen in the characters of Biju and Obinze who have identical experiences. Biju the son of the cook, Pannalal, in The Inheritance of Loss immigrates to America in search of a life that would save him from the stymieing indigence in India. However, his earliest realizations of his status as the other occured in India itself. The process of procuring a visa for him became as daunting a task as that of surviving in the United States. The Americans approving the visas assumed the position of the colonizer, refusing to let the colonized a glimpse of their superior existence. They exacted their will on the Indians, subjecting them to a fate-like arbitrariness. Desai writes, "Some officers seemed amiable than others, some scornful, some thorough, some were certain misfortune, turning everyone away." (Ch.30) Yet to Biju, humiliation was a small price to pay in exchange for chance to build one's life in the land of the white man, and "…it was a fact accepted by all that Indians were willing to undergo any kid of humiliation to get into the States. You could heap rubbish on their heads and yet they would be begging to come crawling in…" (Desai ch.30).

But once in the States, Biju became aware of the undesirability of his presence. Turned away from one employment prospect to the other, Biju hungered for the green card that would establish him as a citizen of America. He existed in the liminal state between that of being a legitimate citizen of one country and the unaccounted for, unrecognized burden of another country. The sheer necessity of survival forced him to give up bits of all that which made him an Indian. Stripped off his legality he made desperate attempts at asserting his identity in small, unremarkable ways. He began to hunt for places to work at which did not require him to cook beef as a reification of his identity as a Hindu. Yet America with its promise of a life of ceaseless bliss, failed to keep Biju tied to itself and Biju's return to India becomes an avowal of his preference for the life he left behind. His return to India however was not marked by the celebration of his success in America but by the robbing off of all that he had gained in America. He was pared of his American dollars and even his habiliments until he was simply spared his dignity. He came back to his father physically exposed deeply symbolic of the speciousness of his quest to America. His voyage to the land of the white man made him aware of his identity as the other. Rather than attempting a mimicry of the white man, he tried to cling to his identity of that of an Indian Hindu. He returned to his homeland having gained neither the mannerisms nor the capital that would have marked his proximity to the white man.

Obinze too immigrates to the UK in search of opportunities, but unlike Biju, he was educated and belonged from a middle-class family. Adichie describes how Obinze essentially suffered from "the oppressive lethargy of choicelessness" (ch.29) in Nigeria. People like Obinze were, "...raised well fed and watered but mired in dissatisfaction, conditioned from birth to look towards somewhere else, eternally convinced that real life happened in that somewhere

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else…" (ch.29) and it was for this conviction of a better life somewhere else that he risked faking a marriage with a European woman for the papers which he needed to continue staying in the UK long after his visa had expired. The crisis of his identity started when he too like Ifemelu had to become Vincent to work in the UK. His disconcertedness with his identity like Biju's was two-fold; not only was he black, but he was also illegal and therefore he was the other that needed to be removed. Obinze accepted his deportment from the UK without protestations, as he felt "The last shard of his dignity was like a wrapper slipping off that he was desperate to retie." (Adichie ch.30). Obinze's experience in the UK as the other was one that he had expected and one which did not tempt him to attempt a mimicry of the white man. So acute was his awareness of himself as the other who was unwanted and so deep-seated was the resultant humiliation that he returned to Nigeria without any aspirations for building his life anywhere other than his own country. While Obinze eventually built his fortune in Nigeria, Biju probably returned to his life of persistent pecuniary troubles in Kalimpong.

Augustine Uka Nwanyanwu in his essay, Transculturalism, Otherness, Exile, and Identity in Chimamanda Ngozi Adichie's Americanah writes, "Migration, involving navigation across socio-spatial thresholds, is also a movement across historical spaces; one leaves the baggage of one (sic) history behind as best one can in order to enter another dimension of history." (391) and all of the characters initially try their best to jettison their socio-cultural identities to achieve an obsequious amalgamation with the white way of life. Jemubhai Patel, tries to mimic the white man to the best of his abilities but fails because of his realization of its impossibility. Ifemelu succeeds at mimicking the white man and in becoming that which appeals to the white sensibilities but gives up her apparent achievement in favour of her own culture and race. Obinze and Biju become aware of their own awareness but never attempt a mimicry, having understood the falsity of the white way of living. Therefore both in the works of Desai and Adichie the presentation of the immigrant issues of alienation, loss of identity, otherness and attempts at mimicry delineate the essential sameness of these experiences across the colonial and predominantly post-colonial world order.

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