



COVID-19:
ORIGIN, IMPACT AND MANAGEMENT
PART 1



Editors:
Alfred J. Lawrence
Tahmeena Khan

Bentham Books

COVID-19: Origin, Impact and Management

(Part 1)

Edited by

Alfred J. Lawrence

*Department of Chemistry
Isabella Thoburn College,
Lucknow, India*

&

Tahmeena Khan

*Department of Chemistry
Integral University,
Lucknow, India*

COVID-19: Origin, Impact and Management (Part 1)

Editors: Alfred J. Lawrence & Tahmeena Khan

ISBN (Online): 978-981-5123-88-3

ISBN (Print): 978-981-5123-89-0

ISBN (Paperback): 978-981-5123-90-6

© 2023, Bentham Books imprint.

Published by Bentham Science Publishers Pte. Ltd. Singapore. All Rights Reserved.

First published in 2023.

CONTENTS

FOREWORD	i
PREFACE	ii
LIST OF CONTRIBUTORS	iii
CHAPTER 1 THE OUTBREAK OF COVID-19 CORONAVIRUS AND ASSOCIATED FACTS AND FACTORS	1
<i>Anushka Pandey, Anju Verma, Pavan Kumar Nagar and Tahmeena Khan</i>	
INTRODUCTION	2
COVID-19	2
Dashboard for Geographic Information Systems (Updated April 27, 2020)	3
TYPES OF VARIANTS	4
Variants of Concern in the India & US: Delta Variant	5
<i>Infections and Spread</i>	5
Vaccine	6
Treatments	6
Statement from the Centre for Disease Control and Prevention (CDC) on B.1.1.529 (Omicron Variant)	6
Update	6
The following are the most important details to be aware of:	7
Why a booster dose of vaccine is required?	7
COVID-19 CASES IN INDIA	7
MATERIALS AND PROCEDURES	9
Data Gathering	9
<i>COVID-19 Discernible Symptoms in Possible Order</i>	9
<i>Variation of Respiratory Disorders & the Order of Observable Symptoms</i>	10
FACTORS AFFECTING COVID-19 OUTBREAK	13
Adolescents and Teenagers with Coronavirus Disease (COVID-19)	13
Breastfeeding and Coronavirus	15
Coronavirus Disease (COVID-19): Contact Tracing	16
Climate Science and Coronavirus Disease (COVID-19)	16
Contraception and Family Planning are Important in the Case of Coronavirus Disease (COVID-19)	16
Coronavirus Disease (COVID-19): HIV-Positive Persons and COVID-19 Vaccinations	17
VACCINES AGAINST COVID-19	18
Delta Variant	20
SUMMARY	21
DATA TABLE	22
CONCLUSION	24
CONSENT FOR PUBLICATION	25
CONFLICT OF INTEREST	25
ACKNOWLEDGEMENTS	25
REFERENCES	25
CHAPTER 2 HYPOTHETICAL STUDY ON ORGANOPHOSPHATES AND SARS-COV-2 COLLABORATING IN CAUSING SEVERAL RESPIRATORY AND IMMUNE DISEASES FOR FUTURE GENERATION: A REVIEW	27
<i>Nitya Dubey, Tahmeena Khan, Pavan Kumar Nagar, Brijesh Singh and Anju Verma</i>	
INTRODUCTION	27

Respiratory Effects upon Exposure and Usage of Pesticides	30
Chemical Reaction and Toxicokinetics of Pesticides	31
ORGANOPHOSPHATES AND SARS-COV-2: MECHANISM TO DAMPEN THE FUNCTIONING OF RESPIRATORY AND IMMUNE SYSTEM	33
SARS-COV-2	34
.....	34
<i>Morphology</i>	34
<i>Biochemistry</i>	35
<i>Physiology and Mechanism</i>	35
COMPARATIVE STUDY OF THE IMMUNOTOXICITY MECHANISM AND RESPIRATORY DYSFUNCTIONING BETWEEN ORGANO-PHOSPHATE BETWEEN ORGANOPHOSPHATE AND SARS-COV-2	38
ALTERNATIVE MEASURES TO GET THE BETTER YIELD WITHOUT USING ORGANOPHOSPHATE PESTICIDES TO SHUN THE FUTURISTIC VULNERABILITY TOWARDS SARS-COV-2	40
CONCLUSION	41
CONSENT FOR PUBLICATION	42
CONFLICT OF INTEREST	42
ACKNOWLEDGEMENTS	42
REFERENCES	42
CHAPTER 3 AIR QUALITY VARIATION ASSOCIATED WITH PARTICULATE MATTER IN MAJOR NORTH INDIAN CITIES DURING DIWALI 2020: SUSCEPTIBLE VEHICLE FOR SARS COV-2 TRANSMISSION	47
<i>Ancey Abraham and Insha Abbas</i>	
INTRODUCTION	47
PARTICULATE MATTER: ROLE IN COVID-19	49
PM Exposure Increases the Risk of Developing COVID-Associated Morbidities	49
<i>PM can be a 'vehicle' for SARS-CoV-2 Transmission</i>	49
PARTICULATE MATTER IS SUSPENDED IN THE AIR FOR LONGER IN WINTERS DIWALI AND THE COVID-19 PANDEMIC	51
The Burning of Firecrackers Contributes to Air Pollution	53
<i>The Chemistry of Fireworks</i>	54
IMPACT ON AIR QUALITY VARIATION AND HEALTH DURING DIWALI 2020: A CASE STUDY	56
Material and Methods	56
Results and Discussion	57
<i>Short-Term Exposure</i>	59
<i>Meteorological Parameters and their Effect on AQI</i>	61
RESPIRATORY HEALTH AROUND THE GLOBE	63
CONCLUSION	64
CONSENT FOR PUBLICATION	64
CONFLICT OF INTEREST	64
ACKNOWLEDGEMENTS	64
REFERENCES	64
CHAPTER 4 COVID-19 AND MODERATING EFFECTS OF GOVERNMENT STIMULUS	67
<i>Mehul Raithatha and Robinson Reyes-Peña</i>	
INTRODUCTION	67
DATA AND METHODOLOGY	69
RESULTS	71
Impact of COVID on Real Economy: Moderating Effect of Fiscal Stimulus	71

Impact of COVID on Stock Market: Moderating Effect of Fiscal Stimulus	77
CONCLUSION	86
CONSENT FOR PUBLICATION	86
CONFLICT OF INTEREST	86
ACKNOWLEDGEMENTS	86
REFERENCES	86
CHAPTER 5 PSYCHOLOGICAL DISTRESS AND CONSEQUENCES OF COVID-19 PANDEMIC ON DIFFERENT GROUPS	88
<i>Saimah Khan and Arshi H. Khan</i>	
INTRODUCTION	89
Impact of COVID-19 on the Mental Health of Health Care Workers	91
Impact of the COVID-19 Pandemic on the Mental Health of People with Previously known Mental Disorders	94
Impact of the COVID-19 Pandemic on the Mental Health of People Infected with COVID-19	95
Impact of COVID-19 on the Elderly Mental Health	96
Impact of COVID-19 on the Mental Health of Children, Adolescents and Young ones	98
Impact of COVID-19 on the Mental Health of Women	100
Impact of COVID-19 on the Mental Health of Refugees	102
Impact of COVID-19 on the Mental Health of Homeless People (HP)	103
CONCLUSION	104
CONSENT FOR PUBLICATION	104
CONFLICT OF INTEREST	104
ACKNOWLEDGEMENTS	104
REFERENCES	104
CHAPTER 6 A COMPREHENSIVE CASE STUDY BASED ON THE DIVERSIFIED IMPACTS OF COVID-19 ON CHILDREN'S LIVES, EDUCATION AND OVERALL DEVELOPMENT	112
<i>Faiza Ali, Angila Shahab and Jagrati Sharma</i>	
INTRODUCTION	113
Data And Methodology	114
DIVERSIFIED IMPACT OF COVID-19 ON CHILDREN: POSITIVE AND NEGATIVE ASPECTS	115
Positive Impacts	115
<i>Physical</i>	115
<i>Psychological and Behavioural</i>	116
<i>Social</i>	117
Negative Impacts	118
<i>Physical</i>	118
<i>Physiological and Behavioural</i>	119
<i>Social</i>	121
COVID-19 PANDEMIC, E-LEARNING & CHILDREN	124
Virtual Learning: Promises and Challenges	124
The Absence of Standardized Assessment Presents Challenges for Students during the Cancellation of Board Exams because of COVID-19	125
E-Learning Practices: Positive and Negative Aspects	126
<i>Impacts of E-Learning on Vulnerable (Rural & Poor children) Groups</i>	128
<i>Implications of COVID-19 on Education</i>	129
VULNERABLE GROUPS OF CHILDREN AFFECTED BY COVID-19	130
RECOMMENDATIONS AND EXEMPLARS	131

Following are some Recommendations and Policies that can be Devised to Help Children Afflicted by the COVID-19 Pandemic [58]	132
<i>Reinforcing Food Assistance Programs</i>	132
<i>Initiatives To Alleviate Child Poverty And Relieve Financial Challenges</i>	132
<i>Increment Of Student-Teacher Interaction</i>	132
<i>Drive Re-enrollment Programs To Prevent Students From Dropping Out</i>	133
<i>Assisting Students In Overcoming Large Learning Losses</i>	133
<i>Mitigating Mental Health Problems</i>	133
<i>Initiatives To Provide Smartphones To Less Privileged Students</i>	133
CONCLUDING REMARKS	134
CONSENT FOR PUBLICATION	134
CONFLICT OF INTEREST	134
ACKNOWLEDGEMENTS	135
REFERENCES	135
CHAPTER 7 COVID-19 VACCINES: A BRIEF REVIEW	139
<i>Saman Raza</i>	
INTRODUCTION	139
Live, Attenuated Vaccines	140
<i>Killed or Inactivated Vaccines</i>	141
<i>Toxoids</i>	141
<i>Subunit and Conjugate Vaccines</i>	141
<i>Viral Vector Vaccines</i>	142
<i>Messenger RNA Vaccines</i>	142
<i>DNA Vaccine</i>	142
<i>Vaccines for Protection from COVID-19</i>	144
The Indian Perspective	146
<i>COVISHIELD</i>	149
<i>Efficacy of Covishield</i>	149
<i>Covaxin</i>	149
<i>Efficacy of Covaxin</i>	150
<i>SPUTNIK V</i>	150
<i>Efficacy</i>	151
<i>Side Effects</i>	151
CONCLUSION	153
CONSENT FOR PUBLICATION	153
CONFLICT OF INTEREST	153
ACKNOWLEDGEMENTS	153
REFERENCES	153
CHAPTER 8 COVID-19 VACCINATION ACCEPTANCE, MANAGEMENT AND CONCERNS: A SURVEY-BASED STUDY	156
<i>Saima Arif, Ayushi Tewari, Tuba Siddiqui and Sumaiyya Khan</i>	
INTRODUCTION	157
Medicinal Solution for Treatment of COVID-19 Disease	157
Development of COVID-19 Vaccine	158
MATERIAL AND METHODS	158
ACCEPTANCE OF COVID-19 VACCINE IN INDIA	159
Vaccine Hesitancy	159
Hesitancy in Rural India	160
Plan to Expedite Vaccination in Rural India	161
Socio-Demographic Variables Affecting Vaccine Acceptance	161

Beliefs and Barriers Associated with Vaccination among the General Public	161
Factors Affecting Vaccine Acceptance in India	162
Myth 1: COVID-19 Vaccines are Dangerous and Untested	163
Myth 2: Coronavirus Vaccines can Cause Infertility Issues in Men and Women	163
Myth 3: Coronavirus Vaccines can Alter the Receiver's DNA	163
Strategies to Improve Vaccination Acceptance	164
MANAGEMENT OF COVID-19 VACCINATION IN INDIA	164
CONCERNS AMONG PEOPLE RELATED TO COVID-19 VACCINATION	169
Misconceptions/Myths Among the Indian Population About the COVID-19 Vaccine	171
Reason for Concern and Misconception Regarding the COVID-19 Vaccine in the Indian Population	172
<i>Vaccine Development in a Short Time</i>	<i>172</i>
<i>Social Media Platforms Spreading Rumours About The Vaccine</i>	<i>173</i>
<i>Illiteracy</i>	<i>173</i>
<i>Distrust of People in the Health System</i>	<i>174</i>
CONCLUSION	174
CONSENT FOR PUBLICATION	174
CONFLICT OF INTEREST	174
ACKNOWLEDGEMENTS	174
REFERENCES	175
SUBJECT INDEX	177

CHAPTER 1

The Outbreak of COVID-19 Coronavirus and Associated Facts and Factors**Anushka Pandey¹, Anju Verma², Pavan Kumar Nagar² and Tahmeena Khan^{3,*}**¹ *Toxicokinetics Laboratory, CSIR- Indian Institute of Toxicology Research (IITR), Lucknow-226001, Uttar Pradesh, India*² *Indian Institute of Technology, Kanpur, India*³ *Department of Chemistry, Integral University, Lucknow, India*

Abstract: COVID-19 is a global pandemic resulting in devastating impacts that spread through a virus and are even more contagious than influenza, as evident from the frequent reporting of cluster outbreaks. Although the key problem is that the symptoms are often similar to other common illnesses, such outbreaks can be controlled if individuals with initial symptoms are tested, and further contact tracing is done. The concept presented here discusses the order in which symptoms appear to differentiate it from other respiratory disorders, however, this crucial information is mostly missing. To determine the most likely order of detectable symptoms in COVID-19 patients, we apply a Markov Process to a graded partially ordered set based on clinical observations of COVID-19 cases. A comparison was made between the evolution of these symptoms in COVID-19 and influenza, SARS, and MERS to see if they were present differently. Influenza, according to our hypothesis, begins with a cough, whereas COVID-19 and other coronavirus infections begin with a fever. COVID-19, on the other hand, varies from SARS and MERS in terms of the order of gastrointestinal symptoms. As facilities begin to reopen following the 2020 spring outbreak, our findings support the idea that fever should be used to screen for admission and that appropriate clinical practice should include noting the order of symptoms occurrence in COVID-19 along with other diseases. If this type of systemic clinical approach had been routine, the move from a local to a worldwide pandemic might not have happened.

Keywords: Clinical approach, COVID-19, Fever, Infections, Markov Process, MERS, Pandemic, SARS, Variants.

* **Corresponding author Tahmeena Khan:** Department of Chemistry, Integral University, Lucknow, India; E-mail: tahminakhan30@yahoo.com



Alfred J. Lawrence

Dr. Alfred J. Lawrence is working as Assistant Professor in the Department of Chemistry, Isabella Thoburn College, Lucknow. He is also serving as the coordinator of the Research & Networking Cell and the chairperson of the Internal Quality Assurance Cell (IQAC) of the college. He holds twelve years of teaching experience and twenty years of research experience in Air Pollution monitoring and Health Risk Assessment. He has done his Ph.D. from St. John's College, Agra and holds four years of Post-Doctoral research experience from Purdue University, USA. He has been a visiting scholar to the University of Manchester and Oxford University, UK. He has published more than thirty five research papers in reputed international journals and five book chapters. He has also edited two international books and two conference proceedings. He has completed two research projects and is currently working on a project funded by the Department of Higher Education, Govt. of Uttar Pradesh. He has received many fellowships and was awarded International Society of Indoor Air Quality (ISIAQ) Fellowship, ETH Fellowship and International Society for Environmental Epidemiology Fellowship, Department of Science & Technology Travel Grant, University Grant Commission Travel Grant to present Research work in Ghent University, Belgium; ETH University, Switzerland; ISEE - Italy, University of Scotland, England and AWMA, USA respectively to present his research work.



Tahmeena Khan

Dr. Tahmeena Khan is currently working as an assistant professor, in the Department of Chemistry, Integral University. She did M.Sc., and holds a specialization in inorganic chemistry. She did her M.Phil. in magnetic resonance spectroscopy and magnetic resonance imaging and worked on automated 3D structure determination of proteins for her dissertation. For her doctoral degree, she worked on mixed ligand-metal and mixed metal-ligand complexes of thiosemicarbazones and their therapeutic properties. She holds fifteen years of teaching experience and has published more than forty research papers and twenty book chapters. She also has two international books and two national books as editor and two books as author to her credit. Dr. Khan is also a life member of several academic bodies. She has keen interest in medicinal and environmental chemistry.