

SUMMER TRAINING

A Report

by

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**MBA HOSPITAL AND HEALTH MANAGEMENT
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This report has been prepared for the internship that has been done in order to study the practical aspects of the course and implementation of the theory.

The aim of this internship is to be familiar with the practical aspect and uses of theoretical knowledge and clarifying career goals. I have learned a lot of valuable things while working & I realized that learning is never the same when it comes to practice.

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With regards

Pratibha Gupta

MBA HM-24

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ACRONYMS / ABBREVIATIONS

S.No.	Acronyms	Full Form
1	SARS	Severe Acute Respiratory Syndrome
2	MERS	Middle East Respiratory Syndrome
3	SARS-Cov	Severe Acute Respiratory Syndrome coronavirus
4	WHO	World Health Organization
5	GAD	Generalized Anxiety disorder
6	MDD	Major Depressive disorder
7	NGO	Non-government Organization
8	MBA	Master of Business Administration

Stress among college students amid Covid-19 crisis

Introduction :-

The story of novel Corona had originated during the end month of December 2019 a virus from the Corona family of SARS & MARS emerged as an outburst by the name novel Coronavirus appeared in the capital of Hubei province in the city of Wuhan, China. At the meantime temporary migration of Chinese people make novel Corona outbreak ubiquitous within a month involved approximately 188 countries of the world [1]. Novel Corona was epidemic in its initial stage though the confirmed cases are known from December 2019 but China government enlighten it on 20th January 2020.

Corona is a big family of viruses from a corona viridae family & it has another name (SARS-Cov). The name corona virus emerged from a Latin word corona meaning “Crown or halo” and due to its large bulgy coronal shape with a spike-like protrusion or hump around it which appears like a crown. The spike on the surface of the virus is proteins to infect cells of organisms. So spike, envelope, membrane & nucleoid are the protein which accord with the corona virus structure. Corona virus can survive in airways for few hours and adhesive easily with the skin & can enter through the eyes, mouth, nose, trachea & enters lungs where virus sticks to the cell, multiply and affects the respiratory system [2]. It is believed that the outbreak of this virus is due to illegal wildlife by Chinese in the city of Wuhan [3].

Not long ago, an akin epidemic was faced ubiquitously, SARS (Severe acute respiratory syndrome) was considered as the first-ever global of the 21st century & was originated in Hong Kong city of China. In 2003, there was an outburst of SARS in China and associated with the mental hazards of health consequences of anxiety & stress among Chinese individuals. At the time of SARS an outburst, studies had been investigated on the salubrious groups of the society to know the psychical impact with revealing significant psychiatric morbidities which were found to be associated with youth & vulnerable sections of the society [4]. SARS was a short-lived pandemic & social distancing policy was a preventive measure during that time period. Though the dormancy of globally SARS was quickly identified by WHO & various adoptive measures involved with the deployment of volunteers to control the situation worldwide effectively.

Novel Corona virus was officially declared new name as Covid-19 on 11 Feb 2020 by World Health Organization and on 11 March 2020, the n Covid-19 outbreak was characterized by WHO as a pandemic [1]. On April 22, the WHO's director-general said the virus "will be with us for a long time", pointing to the early stages of outbreaks in some countries, and an uptick of cases in others [5].

Youth are a special group among the population who used to be under pressure in normal circumstances but an outbreak can increase the burden of pressure by developing psychological imbalance & uncontrolled emotion as overthinking, worry, anxiety, and panic situation is general circumstances which arouse due to epidemic. Psychologist worked from decades how a human perceives threaten to themselves and they overreact to pandemic & other associated events & how it brings a stigma in individuals to overreact with that situation affecting their daily outcomes in this crisis [6]. Globally outbreak or epidemic both arise due to psychological imbalance which develops a stressful state. During stressful the mind act & behave differently, the way of thinking & behavior pattern adapts a change & if the individual can't cope up with this stressful condition than it turned into depression & anxiety which influenced individual with their day to day activity, work & social groups [7].

When lock-down begins on 22nd March there were 500 cases in India & strategy of lock-down extension is due to expected upsurge shoot up with the increases in cases of Covid-19 & after that increased in the cases up till now. An outbreak is related to the mental ill status especially affected & infected individuals. Apart from the physical damage to the individual suffering from it, had created wreak havoc in the mental status of individuals involved in every age group? As human is a social being & debarred from the social contact develops anxiety and stress but social media & Internet sources help individual to avoid boredom & loneliness.

Objectives :-

Covid-19 is promoting stress among students due to various stressors like delay in academics, not getting a job, economic fall off, delay in exam results, and mode of online classes, therefore evaluating these metrics and thereby come up with a quantitative approach to estimate the level of stress among college students. This study focus to determine an association between stressors and level of stress among students. Moreover, a correlation study between the GAD scale and level of stress gives a measure to estimate stress among students. The study aims to

determine the association of level of stress between male and female students. This study provides a platform in determining the students which can lead to severe issues like Major Depressive disorder (Mdd), lack of focus in studies, and behavioral changes. This drew the attention of the education hub to combat the stress among college students by introducing several options to reduce stress.

Review of Literature :-

Stress word is originated from a Latin word “sting” meaning “to be drawn tight”. Medical terminology described it as “a stimulus which acts a predisposing element results with alteration in physiological and psychological imbalance which lead to deterioration in health with a perspective signs & symptoms [8]. Studies aim at Stress & anxiety prevalence with the associated contributing factors & its outcome.

“Social distancing” has been replaced by “physical distancing” by WHO so that individuals may not feel secluded & debarred from society. Earlier studies had already focused that living alone or loneliness feeling is a predisposing element of psychological distress. Individuals far from their family due to work, study, or other reasons are more chances of suffering from stress and anxiety. As geriatric are more in concern as a secluded element but pandemic crisis makes everyone feel isolated so from a different section of society this study focus on Stress and anxiety on student's elements issues [9]. There are few studies done on Covid-19 which describes the psychological outcomes on an individual at different aspect related to workplace or academic based on covid-19 but there were previous studies which reflect the psychological status during the outbreak of epidemic & imbalanced after the elimination of epidemic.

The pandemic outburst with locked-down is problematic to individuals including social distant as a preventive measure to combat with the disease, online mode of studies are a new way of demanding task for many of them. Such conditions with the change in their routine activity associated with chaos in learned parity. This results in enhancement of mental equilibrium, lack insufficiency with those altered mechanism results with a psychological disorder of stress and anxiety due to change in their day to day activity [10].

A student use to interact daily with their friends and other people but suddenly a disastrous situation of an epidemic with isolation influenced the day to day life. Psychological aspects

cover continuum dimension in which it covers “perfect health wellbeing” while other aspects are “mental chaos” [11]. Psychological upset is associated with lack of interest in day to day activity and is described as emotionally annoying, fear, angry or swinging of mood disturbing their functioning personal activity. Lack of attention, Lack of appetite, morose, insomnia, etc. are a few examples during a stressful situation. Every person bears a different level of stress with different associated factors. The ubiquity of fear, worry, and anxiety for a longer period flourishes a psychic disorder. Anxiety, depression, alcohol dependency are not associated with the Covid-19 but isolation, social distance & locked down in a particular place for a longer period had created an adverse impact [10]. This study is conducted to explore the cognition, stress, and anxiety level of college students during coronavirus disease 2019 (COVID-19) epidemic.

Covid-19 apart from the physical aspect, it effects wellbeing in deterioration of its mental tonicity. As it's our mind if works efficiently it can combat the battle of any outburst effectively. In this regards college, institution and universities should come forward and reinforce students about the proper understanding regarding the biological catastrophe and how to tackle it's mentally by knowledge and awareness among individuals & students by fulfilling want & concern of mental health status by keeping it healthy from the psychological disorders [1].

Methodology :-

Study Population & Sample -

Cross-sectional study design was adopted as per this research and the target population were students from undergraduate and post-graduate colleges and Universities. The time frame of the questionnaire was 15 days (i.e. from 23 April 2020 to 07 May 2020) and Covid-19 pandemic crisis was at peak level during the studies. 416 students responded to questionnaire & were included in the analysis part.

Data collection -

The data collection process was conducted through an online platform by google forms. The questionnaire was distributed in the University Students and other college students and were told to pass it to other students. Research Questionnaire assured authenticity and confidentiality with the questionnaire.

Research Questionnaire & Rating Instruments -

As studies are concerned with stress among students so the questionnaire was framed with Covid-19 related conditions. Structured packets of the questionnaire were framed based on demographic information in age, gender, residing state, family steady income including cognition behavior questions like (1) Are you staying with your family during this lock-down (2) Is your closed relative or any acquaintance infected with covid-19 ? (3) Do you have corona positive cases in your city or neighbor if yes than because of covid-19 are you really stress? (4) Is your day to day activity really affected by lock-down & one of the reasons for your stress? (5) Are low socio-economic groups getting social support from the government in this crisis? (As some students belong to low socio-economic status) including social support during this outburst of Covid-19.

Factors and stressors related questions on the economy, influence on life, academic & social support were (1) worry about economy Influence? (2) stress-related to academics? (3) Worry about influences on daily/hostel life (Food, Medicine, etc.) (4) Is debarred from social interaction a kind of stress being a student? (5) Is maintaining a social distance from the nearby people is also distressing elements?

Generalized anxiety disorders scale (GAD) a self-rated scale developed by Spitzer and colleagues (2006) as a screening tool and severity indicator [12]. To assess mental health status GAD with 7 symptoms of questions perceived by respondents within a month during locked in. GAD questionnaire consist of (1) Feeling nervous, anxiety or on edge (2) Not being able to stop or control worrying (3) Worrying too much about different things (4) Trouble relaxing (5) Being so restless that it is hard to sit still (6) Becoming easily annoyed or irritable (7) Becoming easily annoyed or irritable and rating of GAD was based on Likert scale ranging from Not at all (1), Several days (2), More than half days (3), Nearly every days (4). GAD is one of the best measuring instrument for diagnosing and screening in clinical practice one of the valid instrument to assess its consistency [13] and last question was - what do you feel the level of stress is being faced by you from the overall response was also based on Likert later on rating Normal (1), Mild (2), Moderate (3), Severe (4). [++++]

Pre-processing Procedure -

At the time of collection of data, there were no missing values found but duplicate values were part of it which were removed simultaneously while some of the columns were deleted based on timestamp, email id, place of residence questionnaire related to economy and their degrees. Data are converted into Nominal & ordinal scales.

Data Analysis -

The estimation of data analysis was done by IBM SPSS version 26.0. A descriptive study approach was applied to assess demographic data through frequency & percentage. Cross tabulation tab to assess stress in genders. The measure of association as a parametric test was applied to test the level of stress and associations with the stressors & GAD.

Ethical Consideration-

All respondents were informed about the research study work purpose and were assured with the reliability & confidentiality of their data.

Results:-

The result suggested that the study had an encounter with stressors based on worry in Academic delay, worry about influences and social life, and worry about any acquaintance infected with Covid-19 affecting the mental health status of both graduates & Post-graduates students. The Mean age of the respondent ($\bar{x}$) is 23.35 and standard deviation (σ) of 3.119, this indicates that the respondent is focused over 20 to 26 years. The level of stress faced by the sample is 45.0% (187) Normal followed by 29.8% (124) Mild, 21.2% (88) Moderate and 4.1% (17) Severe (Table 1.0). So it is cleared that a mild, moderate & severe level of stress is experienced by the students due to Covid-19 on which this research study focused on along with the influencing factors.

Table 1.0

Level of Stress faced by respondents

	Frequency	Percent	Cumulative Percent
Normal	187	45.0	45.0
Mild	124	29.8	74.8
Moderate	88	21.2	95.9
Severe	17	4.1	100.0

Graph 1.0

Level of Stress faced by respondents

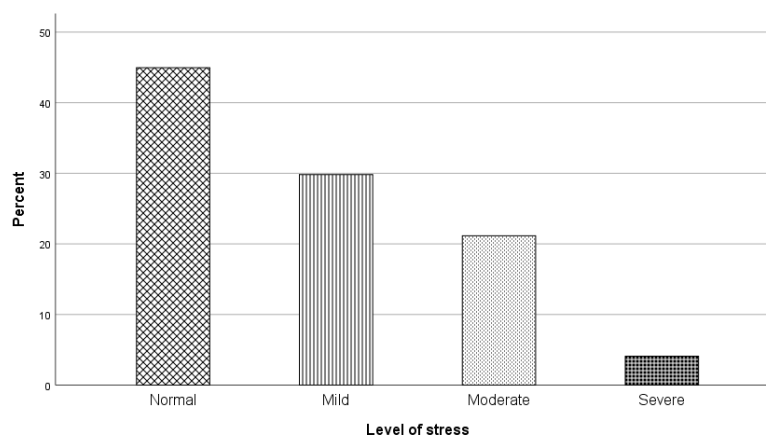


Table 2.0 shows a matrix on demographic variables of the respondent's characteristics. It can be observed that among participants 51.7% (215) were females & 48.3% (201) were males. In terms of Education, 50.2% (209) were male and 49.8% (207) were female. The participants living with family is 90.9% (378) and 9.1% (38) don't live with their family. In terms of participants acquaintance infected with Covid-19 were 4.8% (20) and 95.2% (395) don't get infected. Rural-urban participants 46.9% (195) is stressed due to positive cases in their city among which 36.5% (152) are from urban and 16.6% (69) are from rural places.

Table 2.0

Variable	Characteristics	Frequency
Gender	Male	201 (48.3)
	Female	215 (51.7)
Education	Male	209 (50.2)
	Female	207 (49.2)
Living with family	Yes	378 (90.9)
	No	38 (9.1)
Relative of acquaintance infected with Covid-19	Yes	20 (4.8)
	No	395 (95.2)
Stress due to positive cases in a region	Urban	152 (36.5)
	Urban-Rural	195 (46.9)
	Rural	69 (16.6)

Table 3.0 depicts that 43.5% (181) of collegiate suffers from the worry of not getting job followed by 27.9% (116) suffers from worry of delay in academic followed by 14.6% (62) worry of delay in exam & results, 8.4% (35) suffers from the worry about new methods of online teaching while 5.3% (22) have others concern related to stress. So it is cleared that college students suffers from different spectrum of stress which involved various parameters.

Table 3.0

Academic delay

	Frequency	Percent	Cumulative Percent
Worry of not getting job	181	43.5	43.5
Worry of delay in academic	116	27.9	71.4
Worry of delay in exam & results	62	14.9	86.3
Worry about new methods of online teaching	35	8.4	94.7
Others	22	5.3	100.0

The respondent's cross-tabulation depicts that there is a significant difference in level of stress faced due to positive cases in a region. Table 4.0 imply that normal and mild level of stress is faced more by rural-urban as compared to urban followed by rural while moderate & severe level of stress is faced more by urban as compared to rural-urban followed by rural. So it can be interpreted that participant living in rural areas are less stress as compared to rural-urban & Urban region.

Table 4.0

Level of stress faced by Respondents * Stress due to positive cases in a region : Cross tabulation Count

	Level of stress faced by respondents			
	Normal	Mild	Moderate	Severe
Stress due to positive cases in a region				
Urban	49 (32.24%)	50 (32.89%)	43 (28.29%)	10 (6.58%)
Rural-urban	102 (52.31%)	57 (29.23%)	30 (15.38%)	6 (3.08%)
Rural	36 (52.17%)	17 (24.64%)	15 (21.74%)	1 (1.45%)

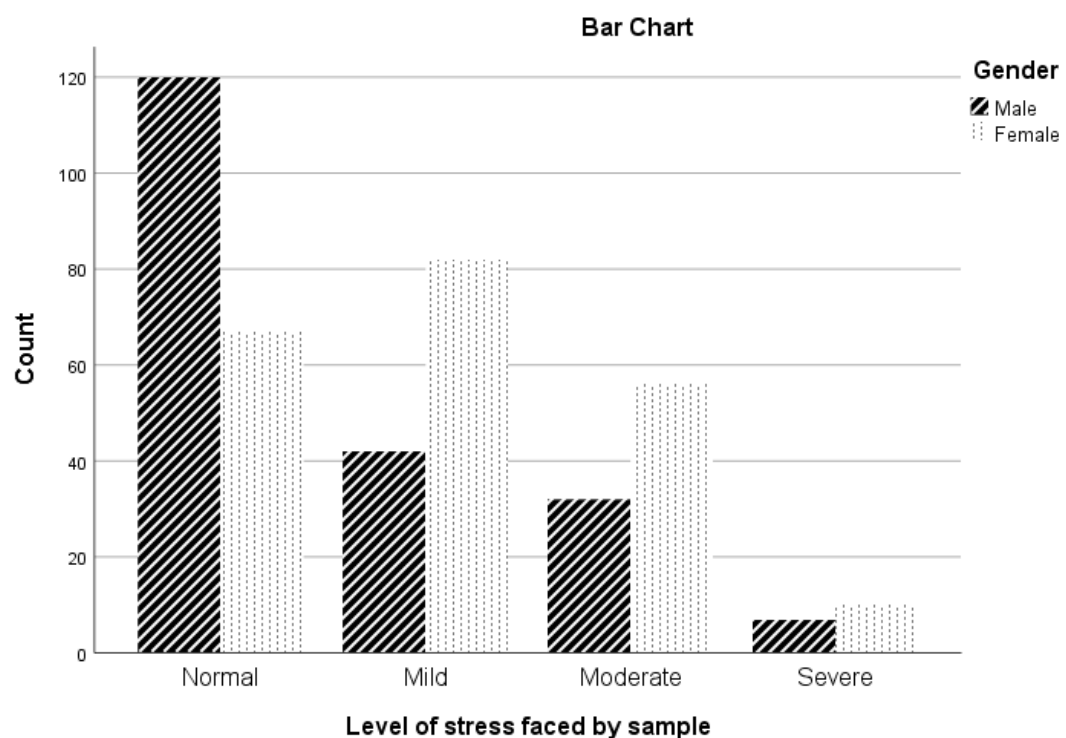
The respondent's cross-tabulation depicts that there is a significant difference in the level of stress faced by Male and Female genders. Table 5.0 imply that mild, moderate & severe level of stress is more faced by a female as compared to males while normal level of stress is faced by male as compared to females.

Table 5.0

Level of stress faced by Respondents * Gender Cross tabulation
Count

	Gender		Total
	Male	Female	
Normal	120	67	187
Mild	42	82	124
Moderate	32	56	88
Severe	7	10	17
Total	201	215	416

Graph 2.0



A Correlation study had been observed between routine & social life influenced by lock-down with different parameters for stress and it was found that a positive correlation had been estimated for worry about influences, social life and social distancing and negative correlation is observed with the level of stress at 0.01 level of significance (2-tailed) (Table 6.0). So from the below results, it can be interpreted that level of stress is associated with the stressors and shows a strong strength between the factors associated with it. The previous studies focused on stressors with the anxiety level with correlation and P values [1] while this study focused on stressors with stress level correlation & 2-tailed test.

Table 6.0
Correlations with stressors

		Worry about influences	Social life influenced by Lock-down	Social distant is distressing due to Covid-19	Level of stress faced by sample
Routine Life affected by Lock-down	Pearson Correlation Sig. (2-tailed)	.149** .002	.300** .000	.222** .000	-.252** .000

		Worry about influences	Social distant is distressing due to Covid-19	Level of stress faced by sample
Social life influenced by Lock-down	Pearson Correlation Sig. (2-tailed)	.245** .000	.348** .000	-.248** .000

** . Correlation is significant at the 0.01 level (2-tailed).

A correlation had been observed in relations with generalized anxiety disorders (GAD) scale and level of stress faced by respondents. GAD scale is used to measure anxiety symptoms disorder in clinical practice by psychopaths and considered as the reliable & feasible approach primary care tools utilize as screening, diagnosing & assessing the anxiety, panic & stress disorders. GAD can estimate a psychometric test with the large sample of population-related to individual mood swings and anxiety states [2]. Table 7.0 imply a positive correlation had been observed between the stress and GAD scale at 0.01 level of significance (2-tailed). It can be elucidated with the results that GAD gives an association with the level of stress, however previous study with GAD scale was done on Cronbach's a tools [3] and this study was done on Correlation and level of significance which even gives appropriate results.

Table 7.0

Correlations with GAD & Level of Stress faced by respondents

		Feeling nervous, anxiety or on edge	Not being able to stop worry	Worrying too much about different things	Trouble relaxing	Restless to sit still	Becoming easily annoyed or irritable	Feeling afraid of awful might happen
Level of stress faced by respondents	Pearson Correlation	.433**	.489**	.441**	.387**	.295**	.344**	.378**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000

** . Correlation is significant at the 0.01 level (2-tailed).

Discussion :-

Studies had recommended that epidemic implies well-being emergencies and has many psychological issues on collegiate students in the form of fret, panic, worry, distress. The aim of this study was to assess the stress stage during an epidemic on male and female college students with the factors influencing and the stressors associated with the level of stress. The studies revealed that Covid-19 outbursts had shoot up stress levels among students due to various circumstances. It had been observed that the epidemic laid Stress as a panic situation profoundly among college genders among which females count higher than male students which states that females stress coping competency is low as compared to males. The previous studies even depicted the psychological condition in the form worry, panic & fear profound more on females than males which reveal that females are a more susceptible character [1].

A positive correlation had been depicted between stressors and the level of stress. Similar studies had been done on Chinese college students in addition to economic stressors which disclose that steady family income is also a contributing factor with the anxiety [1]. Other similar studies (Kernan 2019) implied that the epidemic plays a significant role in the economy of the country as well as in person's life as due to disturbance in the economy the individuals lose their earning source and students stress about college fees (Peng et al., 2012) [14].

The studies focused on the level of stress faced by college students due to pandemic Covid-19 with the associated factors while prior studies focused on academic stress in a distinct year of students related to environmental stressors & personal factors. Fear of failure had been the stress factors for first and second-year students while final year students had stress for future employment. So stress is one of the major factors as concern for society as it is prevailing in globally among students so before it acquires a shape of the pandemic, a positive approach should be implemented on psychological aspects [6].

Many countries had temporarily terminated the educational institutions to curb the expansion of Covid-19. The closure of educational institutes had created a 91% negative impact among students globally. WHO suggested many countries to follow the steps of social & physical distancing by preventing social gatherings to clog the flourish of Covid-19. Implementation in learning patterns via online mode is a major step to prevent mass gathering in a particular room. Online learning reduces contact between students to students and students to lectures thus preventing it to spread however online platforms didn't help students to do group work & assignment with their peer groups [9].

The previous study was done on MBA students to assess the anxiety, depression, and stress due to the recent outbreak which indicates students with depressions 43%, students with anxiety 16% and stress 11% with associated elements such as financial and economic issues, distress about future and social life and retraction of the job [15]. Covid-19 or any kind of pandemic infection when it spreads among individuals than there is no disparity among races, caste, religiosity, society, ethics. A disease or infection don't look people origin & geographic area but creates physical and mental havoc among individuals.

Conclusion :-

An attempt is made to observed stress faced by students amidst of Covid-19 pandemic and about 29.8% of collegiate experienced a mild level of stress. It had been observed that among genders based females are more stressed than males. About 27.9% of college students are more worried about their future employment followed by the worry of delay in academic, exam & results. About 5.3% of them configure worry towards new methods of online teaching pattern & many of them face problems with connectivity especially students who live in remote area [16]. Due to lockdown since a long time stress level among students has been increased significantly with stressors being an aggravating factor. In any catastrophe, themes of panic, anxiety, worry, unpredicted and stigmatization customary act as a road blockers in the mental wellbeing of an individuals.

Global health measures should be recruited to channel for the psychosocial stressors related to isolation/quarantine, social distancing, panic, worry and anxiety are vulnerable in the society especially during time of outbreaks of epidemics. Psychological Interventions must be given importance with the help of NGO & mental health professionals by educating the students about consequences, advice people to lower their exposure to negative news, by promoting healthy behaviors and by preventing social isolation using alternative methods of virtual network during this epidemic. (Banerjee 2020) [15].

The government should work in collaboration with school and college for stress-related issues in this epidemic. Families, schools, college & society should help students to overcome such stress due to lockdown. The care, love and psychological support can help to reduce mental pressure. Moreover, students can utilize their leisure time in upgrading their skills which can help them in upgrading their competency level and can enhance their positive aspects. Students can help of their own by coping strategies to fulfill their needs, desire & concern for themselves & others [17]. Meditation is good therapy for body, health & mind including deep breathing and relaxation technique is the best way to reduce the stress level of your life.

References :-

- [1] MdZahir Ahmed, Oli Ahmed, Zhou Aibao, Sang Hanbin, Liu Siyu, Akbaruddin Ahmad, Epidemic of COVID-19 in China and associated psychological problems, *Asian Journal of Psychiatry*, Volume 51, June 2020, 102092, <https://doi.org/10.1016/j.ajp.2020.102092>.
- [2] <https://simple.wikipedia.org/wiki/coronavirus>.
- [3] <https://economictimes.indiatimes.com/news/et-explains/all-you-need-to-know-about-the-deadly-novel-coronavirus/articleshow/73542980.cms>
- [4] Xiaoyan Liu, Jiaxiu Liu, XiaoniZhong, Psychological State of College Students During COVID-19 Epidemic, *The Lancet Global Health* DOI: 10.1016/j.psychres.2020.112934.
- [5] <https://www.indiatoday.in/india/story/coronavirus-pandemic-covid-19-precautions-symptoms-global-impact-complete-guide-1657761-2020-03-20>.
- [6] Cuiyan Wang,1 Riyu Pan,1 Xiaoyang Wan,1 Yilin Tan,1 Linkang Xu, Cyrus S. Ho,2,3 and Roger C. Ho1,3,4,* Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China, *Int J Environ Res Public Health*. 2020 Mar 6;17(5):1729. doi: 10.3390/ijerph17051729.
- [7] Yu-Tao Xiang,a,b Yuan Yang,a,b,c Wen Li,a,b Ling Zhang,d QingeZhang,d TerisCheung,e and Chee H Ngf, Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed, *Lancet Psychiatry*. 2020 Mar; 7(3): 228–229, doi: 10.1016/S2215-0366(20)30046-8.
- [8] Dr. Kusum Jain* ? Dr. NidhiKakkar** Ms. Divya Jain*, Stress and Academic Stress: A Global Pandemic Volume 3, Issue 3, June 2014, ISSN: 2277-1255 BHARTIYAM INTERNATIONAL JOURNAL OF EDUCATION & RESEARCH.
- [9] SadhikaSood, Psychological effects of the Coronavirus disease-2019 pandemic, *RHiME*. 2020;7:23-6..
- [10] AlirizaArenliu, DashamirBëruxulli, Rapid assessment: Psychological distress among students in Kosovo during the COVID-19 pandemic.

- [11] Ravi Philip Rajkumar, COVID-19 and mental health: A review of the existing literature, *Asian J Psychiatr.* 2020 Aug; 52: 102066, doi: 10.1016/j.ajp.2020.102066.
- [12] Lauren A. Rutter, M.A. and Timothy A. Brown, Psy.D., Psychometric Properties of the Generalized Anxiety Disorder Scale-7 (GAD-7) in Outpatients with Anxiety and Mood Disorders, *J Psychopathol Behav Assess.* 2017 Mar; 39(1): 140–146., doi: 10.1007/s10862-016-9571-9.
- [13] Robert L. Spitzer, MD; Kurt Kroenke, MD; Janet B. W. Williams, DSW; Bernd Löwe, MD, PhD, A Brief Measure for Assessing Generalized Anxiety Disorder, *Arch Intern Med.* 2006;166(10):1092-1097. doi:10.1001/archinte.166.10.1092.
- [14] Kernan, W.D. 2019, Health-related impediments to learning among dental and oral surgery students. *J.Prev.Interv. Community* 47 (1) 32-44.
- [15] Dr. Biswajit Satpathy^{1*}, Esrafil Ali², A study on psychological well-being of final year management students during COVID-19 pandemic lockdown in India. *The International Journal of Indian Psychology*, ISSN 2348-5396 (Online) .
ISSN: 2349-3429 (Print) DIP: 18.01.201/20200802, DOI: 10.25215/0802.201
- [16] Acharya, Samikshya, Stress in the Students after Lockdown due to Outbreak of Corona Virus (COVID-19) (May 15, 2020). SSRN: <https://ssrn.com/abstract=3627022>
or <http://dx.doi.org/10.2139/ssrn.3627022>
- [17] YusenZhai^aXueDu^b, Addressing collegiate mental health amid COVID-19 pandemic, *Psychiatry Research* Volume 288, June 2020, 113003, <https://doi.org/10.1016/j.psychres.2020.113003>

Operations Management: Analysis and Improvement Methods

Name of the Course :**Operations Management: Analysis and Improvement Methods****Course Description :**

The role of operations and how they are connected to other business functions in manufacturing- and service-focused organizations. The use of decision-making frameworks and techniques applicable at all levels, from management-level strategic decisions such as connecting process to the needs of various customer segments, to front-line tactical decisions. A process view of operations that will allow to model both manufacturing and service operations. Also the different kinds of metrics that are used to evaluate the performance of operations. Role that inventory plays in operations and calculating the order quantities, reorder times, and safety stocks that are common in inventory management.

The notion of supply chains and its different components and learning about sourcing decisions and when is it good to outsource manufacturing and when is it good for in-house. The bullwhip effect and way of looking at variability in supply chains

To analyze these processes better than to look after Lean Management, and the Six Sigma methodology and how they are used to continually improve operations and through that reduce waste.

Objectives:-

- Explaining fundamentals of the Process view of Operations and various process of metrics.
- Evaluate process capacity and utilization and a system's inventory using Little's Law.
- Argue on inventory metrics and Interpret cost components of ordering and holding inventories with Economic order and Manufacturing quantity and re-order point.
- An understanding of supply chains and its management & Analyzing the different functions and complexities associated with supply chains & importance of sourcing function.
- Apply the theory of Transaction Cost Economics to sourcing decisions
- Knowing the Bullwhip effect and counter measures for mitigation of that effect.
- Explain the Toyota Production System (TPS)
- Differentiate between value-adding and non-value-adding activities from a customer view-point
- Apply lean management techniques such as 5S, 5-Why, Kaizen and Value Stream Maps
- An understanding of the basic ideas behind the six-sigma quality standard
- Apply the DMAIC and SIPOC processes and infrastructure to implement six-sigma

Course Contents:-

(1) PROCESS ANALYSIS :-

1.1 Process View of Operations are composed of a collection of activities that are Purposeful, Planned, Coordinated to perform activities & for that operations need resources.

a) Process View - Processes are structured activities that transform inputs to outputs.

b) Process Representation- Processes can be represented as a connected network of activities

c) Product vs Process Focus

Product focus – resources and activities required for a “product family” or customer type are grouped together while Process Focused Operations with Similar skills or technologies are grouped together in flow units from one activity to the next in a fixed sequence

d) Batching : Continuous Flow, Single Unit Flow, Batch Flow

1.2 Process Flow Metrics

a)	Cycle Time	Time between two consecutive units departing the process
b)	Flow Rate	Rate at which units depart the system i.e. = $1/(\text{Cycle Time})$
c)	Bottleneck Activity	The activity with the smallest flow rate is called the bottleneck activity. Alternatively, the bottleneck is the activity with the longest cycle time.

1.3 Capacity and Utilization

a) Activity Capacity - It is define as cycle time of an activity.

$$\text{Cycle Time} = \frac{\text{Processing Time}}{\text{Number of parallel stations}} \quad \& \quad \text{Flow Rate} = \frac{1}{\text{Cycle Time}}$$

Effective Flow Time = Processing Time + waiting times

$$\text{b) Utilization} = \frac{\text{Actual Production Rate}}{\text{Available Capacity}} \quad \text{OR} \quad \frac{\text{Time used for production}}{\text{Available Time}}$$

$$\text{c) Implied Utilization} = \frac{\text{Time Used for Production}}{\text{Available Capacity}}$$

1.4 Little's Law

a) Rate of arrival = Rate of departure

b) Average values of metrics being considered : $I = R * T$

(2) INVENTORY MANAGEMENT

2.1 Inventories are goods or materials in any stage of readiness that are being held for future sale.

$$\text{Inventory Metrics} = \frac{\text{Cost of Goods sold}}{\text{Average Inventory}} \quad \text{OR} \quad \frac{\text{Average Inventory}}{\text{Cost of good sold in period}}$$

2.2 **Economic Order Quantity** - Ordering, Receiving, Fixed costs of transporting, denoted by "S"

a) Holding Cost/Item/Year $H = \text{Item Cost} \times \text{Interest Rate} + \text{Storage Cost/Item/Year}$

b) Annual Cost

Annual cost of ordering = numbers of orders*ordering cost/order

Annual cost of inventory = average inventory * holding cost

Total Cost = Cost of ordering + Cost of inventory

c) To minimize the Total Annual Cost we use the Economic Order Quantity (EOQ) $Q^* = \sqrt{\frac{2DS}{H}}$

2.3 **Economic Manufacturing Quantity (EMQ)** $= \sqrt{\frac{2SDR}{H(R-D)}}$

Supplier Lead-time

Supplier delivers the product a fixed time after the order is placed. This is called the lead time (L)

2.4 Re-Order Point

"Order when the amount of inventory on-hand is $D \times L$ ". This is called the Re-Order Point (ROP)

a) Inventory Position = on-hand inventory + inventory on-order

b) **Demand Uncertainty** - To avoid stock-out add extra inventory—Safety stock

c) ROP = Average demand during lead time + Safety stock

d) Period of Uncertainty (POU)

Continuous review: POU = Lead-time

Periodic review: POU = Review interval (r) + Lead-time

2.5 Economic Order Quantity (Order Up To Policy)

a) Order up to level = ROP + EOQ

b) Order Quantity = Order up to level — inventory position

c) Fill Rate Definitions

Fill rate: The fraction of demand that is satisfied or "filled" from inventory

$$\text{Unit fill rate} = \frac{\text{Unit Qty Filled}}{\text{Unit Qty Requested}} \quad \text{Line fill rate} = \frac{\text{Lines Filled}}{\text{Lines Requested}} \quad \text{Order fill rate} = \frac{\text{Orders Filled}}{\text{Orders Requested}}$$

(3) SUPPLY CHAIN

3.1 a) Different views of supply chain – Sourcing, Logistics, Contracts (Needs to specify) (Types of Contracts), Sustainability/social aspects. Risk, Finance

So, Supply chain management is - Active management of intra-firm activities, Maximize customer value, Achieve sustainable competitive advantage

b) Layers of the Supply Chain: Logistics, Information, Financial, Governance

3.2 Sourcing Decisions

Depends on one single firm that controls the whole process from raw material to final product i.e. the vertically integrated firm, Lack of expertise/competence, Lower costs, Resource constraints

a) Outsourcing Risks : Dependence on suppliers, Loss of flexibility, Loss of core activities, Intellectual Property (IP) loss, Supplier financial risk

b) Transaction Cost Economics :

Asset Specificity: Specialized investments made by one or both parties to enable the transaction

Uncertainty: The inability of one of both parties to predict the environment or each other's behavior

c) The Make or Buy Decision Table

	Make	Outsource
Strategy	• Allows product or service differentiation • Synergies across business • Hostile supply market • Need to push technology envelope	• Business/environment is unattractive • Non-critical end product • Stable/dependable supply market • Suppliers are capable and innovative
Risks	• Few suppliers • Market risks • Need for quick response • Intellectual Property	• Holdup risk is manageable • Low switching costs • Short lead times • No IP risks
Economic Factors	• Internal cost advantage • Recent process investment • Significant skills/expertise	• Supplier has lower cost • Major investment required • Weak in-house skills

3.3 Bullwhip Effect

Bullwhip is effect when small perturbation at one end results in changes of upstream in supply chain, the actual demand chain gets distorted to the retailer and passes to the supply chain.

a) Contributing Factors - Demand variability, Panic ordering, Strategic ordering, Batch quantities, Quantity discounts, Trade promotion, Lead-times

b) Combating Bullwhip : Information Sharing, Manufacturing Decisions, Marketing Decisions

(4) CONTINUOUS IMPROVEMENT

4.1 Edward Deming - Father of Japan's post-war industrial revival

Chain Reaction-14 Principles of Management

a) P-D-C-A Cycle

Plan—study the current process; identify possible improvements; What to measure? Who will do?

Do – implement the change

Check – did the change lead to expected results?

Act – fully implement if it works; create new baseline

b) Toyota Production System (TPS) - Elimination of “waste”

Taiichi Ohno - Industrial engineer who helped create the TPS

Shigeo Shingo - Industrial engineer and consultant who popularized TPS in Japan and US

TPS became “**lean management**” in the US

c) Six-Sigma Methodology - Originated in Motorola in the 1980's

William B. Smith and Mikel J. Harry are credited as cofounders

Applies rigorous statistical methods to improve quality

4.2 Lean Management

US version of Toyota Production System

- Elimination of waste in processes through continuous improvement
- Simplification of work

a) Value - Customer's perspective, Quality, Delivery, Cost

b) Types of Activities

Activities	Explanation	Expectation
Value Adding Activity	• Changes the form, function, or features of product and service. • Something the customer is willing to pay.	Maximize
Essential Non-Value Adding Activities	• Required due to regulations, policies, etc.	Minimize
Non-Value Adding Activities	• Consumes resources but does not add value. • Invisible to customer.	Eliminate

c) 7 Types of Waste

Waiting	People, parts, or equipment waiting for a previous step to be completed
Inventory	Unnecessary storage of material
Processing	Producing a higher quality product or service than required
Correction	The effort wasted inspecting for and fixing defects
Overproduction	Producing more products or services than the customer wants
Motion	Movement of people that does not add value
Material movement	Transportation of material, people, or equipment

d) Principles of Lean

- Customer-focused **Value**
- Identify all steps in the “**Value**”
- **Stream**” Eliminate wasted steps
- Make product **Flow** smoothly
- Let customer **Pull** product
- Create **Perfection** or ideal state with no waste

e) Lean Tools - Value Stream Mapping

	5 S	
1.	Seiri	Sorting or Organizing
2.	Seiton	Set in order (Simplify Access)
3.	Seiso	Shine (Cleaning or Sweeping)
4.	Seiketsu	Standardize neatness
5.	Shitsuke	Sustain (Self-Discipline)
	5 Whys	A simple root cause analysis technique (Eg - My car won't start!)
1.	Why?	There is no gas going to the engine
2.	Why?	There is no gas in the fuel tank
3.	Why?	I did not fill the tank
4.	Why?	I don't have any money
5.	Why?	I spent it all on new clothes
	Kaizen	Small group improvement activity. Use the line workers creativity to reduce waste 3-5 days of effort

	Work Cells	Create natural groupings of tasks/products (Part Family) and equipment/personnel needed to do them (Machine Group). Single piece flow in the cell and One operator per cell if possible
	Standardized Work	Every process step is rigorously documented Sequence of task steps are specified with cycle times, inventory required, tools, and equipment needed. Everyone know their exact roles and responsibilities

4.3 Six-Sigma Methodology

a) **Origin of Six-Sigma** - Originated in Motorola, Wake-up call, Bill Smith's insight

Why is Three-Sigma not Enough?

For a normal distribution with mean = μ and standard deviation = σ , a value greater than $\mu + 3\sigma$ has a probability of occurring of 0.001349

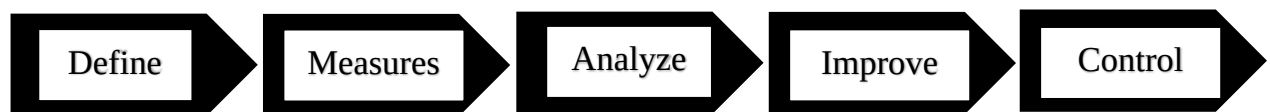
b) DPMO

$$\text{Defects per opportunity (DPO)} = \frac{\text{Number of Defects}}{\text{Number of defect Opportunities}}$$

$$\text{DPMO} = \text{DPO} \times 10^6$$

c) Motorola Shift (MS)

D-M-A-I-C (Five step process for Six-sigma)



Define	What is the problem? Who does it affect? Customers? What needs to be measured? SIPOC Tool - A simple tool to define the problem – Suppliers–Inputs–Process–Outputs–Customers
Measure	Establish a baseline, What are the Key Performance Indicators (KPIs)? What and how to measure? Quantifiable performance measure–The “Y”
Analyze	Identify the “root causes”
Improve	Brainstorm solutions, Implement the easiest solutions first Test solutions–Use P-D-C-A, Implementation plan, Deploy solution
Control	How to sustain the improvement? Who is responsible? How do we measure? Use of statistical control chart

d) Six-Sigma Infrastructure

Highest level possible in the Organization– Often C-level executives

- Executive Leadership, Champions and sponsors, Master black belts, Black belts
Green belts, Yellow, white etc. belts

- Provide strategic focus to the program
- Identify individual projects
- Align to mission and vision
- Remove roadblocks
- Trains the Black Belts and Green Belts
- Helps as a technology/methodology consultant to Black Belts
- Has a program-level focus rather than project focus.

Learning Methodology:-

- Lectures
- Videos
- Reading Materials

Key Learnings :-

- Process view of operations, its flow types with process metrics & Bottleneck activity.
- Calculation of the metrics and Process capacity calculations under different scenarios
- Understanding Capacity and Implied utilization and Capacity calculation for Continuous flow processes
- Enhance my knowledge with the inventory measures and its performance
- The cost associated with ordering decisions.
- Understanding supply-chain, its sources & how it helps in sourcing decision.
- Knowing Bullwhip effects with the factor involved and combating Bullwhip.
- Understanding lean Management with the value, type of activities, waste & principles Improvement in the Process & quality
- Applicability of SIPOC tools
- DMAIC improvement cycle as an effective technique for structural changes