Summer Training Report (Part 1)

By Sonal Jain

MBA (Hospital and health management)

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IIHMR UNIVERSITY

Acknowledgements

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Finally, I want to thank my mother for her constant support and encouragement that keep me motivated to work throughout this pandemic.

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Acronyms/Abbreviations

1. CDC – Centers For Disease Control & Prevention
2. COVID-19 - Corona Virus Disease 2019
3. HCWs – Health Care Workers
4. HP- Healthcare Providers
5. ICMR – Indian Council Of Medical Research
6. MoHFW – Ministry of Health & Family Welfare
7. MBBS – Bachelor of Medicine, Bachelor of Surgery
8. nCoV – Novel Corona Virus
9. PPE – Personal Protective Equipment
10. PPS - Probability Proportional to Size
11. SARS - Severe Acute Respiratory Syndrome
12. WHO - World Health Organization
13. SL – Sick Leave
14. CL- Casual Leave
15. PL- Privilege Leave

THE MENTAL HEALTH PANDEMIC AMONG THE HEALTH CARE WORKERS DUE TO COVID-19

1. Abstract:

With the COVID-19 outbreak, surveillance in infection control has increased in both general public and hospital levels, and its psychological impact on hospital staff is expected to increase. The mental health of the frontline healthcare workers is a serious matter of concern, as they are the ones who are working day and night to save the lives of the pandemic sufferers by risking their own lives. In order to understand the current mental state of the frontline healthcare workers this study has been conducted, also to understand what they are doing to combat the stress induced by this pandemic. So in this study an online survey has been carried out consisting 3 parts to understand the perceived stress among the healthcare workers (HCWs) and the activities they are doing to combat the same. Analysis and interpretation was done on the basis of the responses obtained by the healthcare workers through the questionnaire using Ms Excel and graphical presentations. Secondary data on number of cases of COVID-19 and frontline workers in Delhi was collected from the websites of WHO, MoHFW, ICMR and CDC. Search engines used for review of literature and collecting secondary data are; PubMed, Google Scholar. Analysis and interpretation of primary data are done. We found that there is a significant increase in stress levels of the healthcare workers due to the global pandemic of COVID-19. They are experiencing different symptoms like difficulty in sleeping, difficulty in concentration, feeling of frustration, anxiety and irritation due to increased workload. HCWs are afraid to visit their houses as the disease is highly contagious and there is no treatment available till now. Stigmatization of rejection from the society is also a big fear among the HCWs hence the contributing factor to cause stress.

2. Introduction

Coronavirus disease-2019 (COVID-19) also known as 2019 novel coronavirus (2019-nCoV) was identified in December 2019 in Wuhan city, China. On 11 March 2020 WHO declared Noble CoV as a pandemic as the number of cases were rising very rapidly in European regions.

In India, first case was reported on 30 January 2020, as of 24 July, 2020 MoHFW have confirmed 4,40,135 active cases, 8,17,208 recoveries and 30601 deaths in the country. Thousands of HCWs are working round the clock to confront it head on. Battling this highly infectious pandemic HCWs are under both physical and mental stress.

More than 2000 HCWs have tested positive of COVID-19 in Delhi alone and at least 70 Indian doctors have died of COVID so far. As stated in a study on HCWs in Wuhan 50.4% reported symptoms of depression, 44.6% anxiety, 34.0% insomnia, and 71.5% reported distress , due to this pandemic, we can clearly see how important it is to address the psychological issues faced by healthcare workers.

Review of literature

- A study to examine the psychosocial impact of COVID-19 on frontline HCWs in Wuhan shows the prevalence of increased depressive and anxiety symptoms. 12.7% and 20.1% of HCWs had mild depressive and anxiety symptoms, respectively. More than half (59.0%) had moderate to severe levels of perceived stress Depressive and anxiety symptoms were more common among women.
- Another study titled Psychological Impact and Coping Strategies of Frontline Medical staff during the Outbreak of Coronavirus Disease 2019 (COVID-19) in Hubei, China says that they believed they had a social and professional constraint to continue working long hours. Medical staffs were worried regarding their safety and the safety of their families and reported psychological effects due to increase in mortality from COVID-19 infection. It also resulted in increased stress for medical staff in adjacent Hunan province. Continued acquiescence of the medical staff by hospital management and the government, provision of infection control guidelines, specialized equipment and facilities for the management of COVID-19 infection should be identified as factors that may motivate medical staff to work during future epidemics.
- A Cross-Sectional study by Kang et.al on 994 medical doctors and nurses in Wuhan states 36.9% had sub threshold mental health disturbances, 34.4% had mild disturbances, 22.4% had moderate disturbances, and 6.2% had severe disturbances.

- Another study on 1257 HCW that included 20 hospitals in Wuhan, states 50.4% reported symptoms of depression, 44.6% anxiety, 34.0% insomnia, and 71.5% reported distress. The study used cross sectional stratified design and Patient Health Questionnaire-9, Generalized Anxiety Disorder scale, Insomnia Severity Index, and the Impact of Event Scale-Revised to conduct the study.
- A study on Frontline health care providers (HP) who were involved in the care of patients with COVID-19 or the ones who were suspected of COVID-19.
  The Sample size wasn't specified.
  Held in Tertiary hospital in North India using qualitative analysis approach and identified main themes for mental health promotion of HP as follows:

1. Positive Motivational factors
   a. Intellectual
   b. Emotional
2. Negatives, frustrations associated with patient care
3. Personal fears and annoyances experienced by doctors

4. Objectives

- To study the present mental health condition of the frontline medical health workers.
- To study the perceived stress levels among the frontline healthcare workers.
- To study the different strategies adopted by the frontline healthcare workers to manage the stress induced by this crisis.

5. Methodology & materials

In this research we are trying to study the stress induced by the COVID-19 pandemic among the frontline healthcare workers. This pandemic is turned out to be more of a stress pandemic for the frontline workers. Also, we want to understand the different measures adopted by them to combat this stress. To fulfill the objective of the research in this study we have used quantitative analytical approach of the research. Our target population is the frontline healthcare workers in the hospitals of Delhi, here the frontline healthcare workers are the people working in the hospitals of Delhi (government, private, semi government) including

doctors, nurses, midwives, interns, lab technicians, administrative and support staff who all are at the highest risk of exposure to COVID-19 infection.

Sample size estimation:

Total population size: Total no. of frontline healthcare workers working in Delhi hospitals:

Total MBBS doctors- 17996 Total nurses and midwives: 41068 Lab volunteers: 350 Pharmacists: 27302 Physiotherapist: 138 Total: 86854

Box 1: Total population size: Total no. of frontline healthcare workers working in Delhi hospitals:

Data Source: MoHFW

At the 95% confidence level and 5% margin of error we will calculate our sample size. As the target population is more than 10,000 the formula for sample size estimation will be:

$$\mathbf{n = z^2p*q/d^2}$$

where, n= desired sample size

z= standard normal deviate (1.96 for 95 % confidence interval)

p= proportion in the target population (0.5)

q= 1-p = 0.5

d= degree of accuracy i.e., 0.05

so, the sample size will be:

n= 1.96*1.96*0.5*0.5/0.05*0.05

n= 384.16

By this calculation the estimated sample size came to be 384. By the method of Probability Proportional to sampling (PPS), sampling distribution was done as follows:

Total MBBS doctors- 17996/ 100 doctor

Total nurses and midwives: 41068/200 sample

Lab volunteers: 350/40 sample

Pharmacists: 27302/50 sample

Physiotherapist: 138/10 sample

TOTAL = 400

The above mentioned was the estimated sample size to conduct the survey but due to COVID limitations above mentioned sample size cannot be achieved. Hence we had to reduce the sample size. As many as 280 HCWs responded to the survey for the study.

Data collection: For this study we have surveyed total 280 frontline healthcare workers including Physicians (64), Nurses (100), Lab volunteers (31), Pharmacists (50), Physiotherapists (19) and other med staff (16) using online survey with Google forms. The respondents were forwarded the survey of 15 questions including a consent form to participate in the survey, using mail ids and social media platforms. The survey link was opened on 7 May, 2020 at 10.00 GMT +5.30 and closed on 30 May, 2020 at 12.00 GMT +5.30.The questionnaire was kept short, due to busy schedules of the HCWs.

Limitations of the study design

(1) Estimated Sample size could not be achieved due to pandemic and busy schedules of frontline healthcare workers.
(2) Data collection took little longer than normal due to non-respondents
(3) Had to keep the survey questionnaires shorter keeping in mind the busy schedules of HCWs.

6. Analysis and Interpretation

6.1 Assessment Of Fear Of Getting COVID-19 Infection Among The Frontline Healthcare Workers

Table 1: Fear assessment of getting COVID-19 infection among HCWs

	Mild	Moderate	Severe
1. **Fear of getting corona virus infection, even**	**67**	**189**	**24**

after taking all the preventive measures?			
2. **Afraid to go to home as there is a chance of affecting your family members through your contact**	**49**	**125**	**106**
3. **Fear of losing your life because of the rapid spread of the COVID-19 INFECTION?**	**93**	**111**	**76**
4. **Fear of stigmatization of rejection from the neighborhood due to hospital work**	**65**	**126**	**89**

Source : original

Respondents (HCWs) in order to assess the fear of getting COVID infection they were given three options; mild, moderate and severe to choose from the perspective opinion provided 1) Fear of getting corona virus infection, even after taking all the preventive measures, 67 respondents are mildly fearful, 189 moderately and 24 assessed themselves as severely fearful of getting corona virus infection even after taking all the preventive measures. 2) Afraid to go to home as there is a chance of affecting your family members through your contact, 49 respondents are mildly afraid, 125 moderately and 106 are severely afraid to go to home because chances of affecting their own family members through their contact. 3) Fear of losing your life because of the rapid spread of the COVID-19 Infection, 93 respondents are mildly fearful, 111 moderately and 76 assessed themselves as severely fearful of losing their own life because of the rapid spread of infection. 4) Fear of stigmatization of rejection from the neighborhood due to hospital work, 65 respondents are mildly fearful, 126 moderately and 89 assessed themselves as severely fearful of stigmatization of rejection from the neighborhood due to hospital work.

Interpretation

1. **23.9% are mildly, 67.5% are moderately and 8.5% are severely fearful of getting COVID-19 infection even after taking preventive measures.**
2. **17.5% are mildly, 44.6% are moderately and 37.7% are severely afraid to go to home as there is a chance of affecting your family members through your contact**

3. **33.2% are mildly, 39.6% are moderately and 27.1% are severely fearful of losing your life because of the rapid spread of the COVID-19 infection**

4. **23.2% are mildly, 45% are moderately and 31% are severely fearful of stigmatization of rejection from the neighborhood due to hospital work**

6.2 Assessment Of Perceived Stress Levels Among Frontline Health Care Workers Due To Covid-19

Table 2: Perceived stress levels among HCWs due to COVID-19

	Never	Sometimes	Always
1. In the last month how often have you been upset / depressed because of something that happened unexpectedly?	58	195	27
2. How often you felt irritated, angry or frustrated because of the increased workload due to this COVID-19 pandemic?	66	129	85
3. How often you find it difficult to concentrate on your work and feel restless?	62	140	78
4. How often you find it difficult to fall asleep at night?	56	147	77
5. How often you feel like you can develop an OCD due to frequent hand washing habits due to COVID-19?	87	127	66

Source : original

Respondents (HCWs) in order to assess the perceived stress levels were given 3 options; never, sometimes and always to choose from the perspective opinion provided 1) In the last month how often have you been upset / depressed because of something that happened unexpectedly, 58 respondents never felt depressed, 195 sometimes and 27 respondents always felt depressed in last one month due to unexpected happenings. 2) How often you felt irritated, angry or frustrated because of the increased workload due to this COVID-19 pandemic, 66 respondents never felt irritated, angry of frustrated, 129 sometimes felt and 85 respondents always felt angry, irritated or frustrated because of increased workload due to

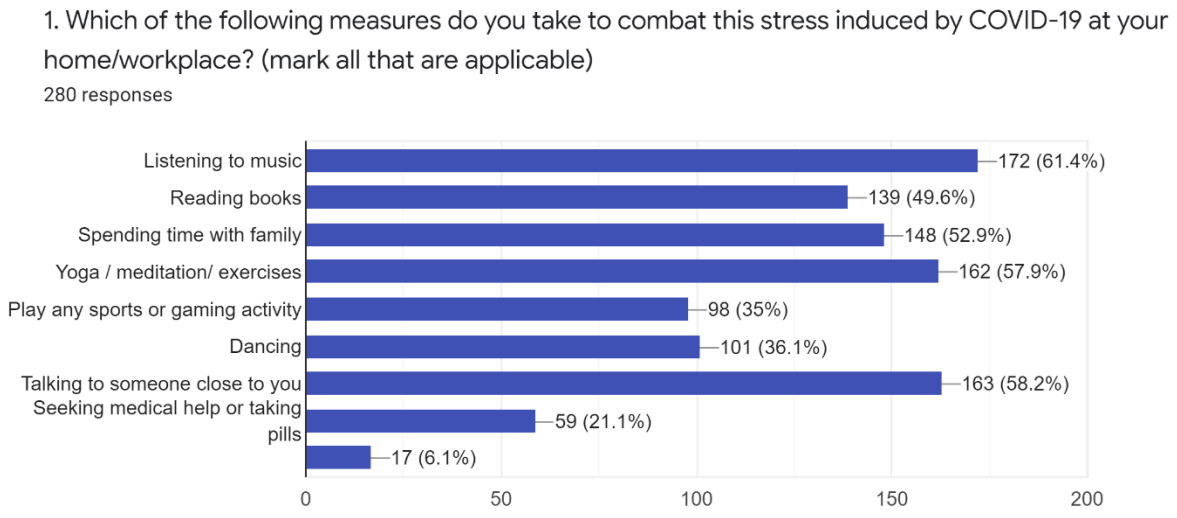
COVID-19 pandemic. 3) How often you find it difficult to concentrate on your work and feel restless? 62 respondents never find it difficult to concentrate on work, 140 sometimes find it difficult and 77 respondents always find it difficult to concentrate on work or the feeling or restlessness. 4) How often you find it difficult to fall asleep at night? 56 respondents never find difficulty in sleeping, 147 sometimes find it difficult to fall asleep and 77 always find it difficult to fall asleep. 5) How often you feel like you can develop an OCD due to frequent hand washing habits due to COVID-19? 87 respondents never felt like developing an OCD due to frequent hand washing. 127 sometimes feels so, and 77 respondents always feels like they can develop an OCD due to frequent hand washing habits due to COVID-19

Interpretation

1. **69.6%** of respondents say **sometimes** while **9.6 %** say **always** they have been upset / depressed because of something that happened unexpectedly last month.
2. **46.07%** sometimes and **30.3%** always, felt irritated, angry or frustrated because of the increased workload due to this COVID-19 pandemic
3. **50%** of respondents says sometimes while 27.8% says always they find it difficult to concentrate on work.
4. **52.5%** sometimes find it difficult to fall asleep at night while **27.5%** always find it difficult to fall asleep at night.
5. **45.35%** sometimes feel like they can develop an OCD due to frequent hand washing habits due to COVID-19 while **23.57%** always feels like this. .

6.3.1 Assessment Of The Measures/ Strategies Adopted By The Frontline Healthcare Workers (HCWs) To Combat This Covid-19 Pandemic Stress:

To assess the measures/strategies adopted by HCWs they were provided with the following options (as shown in Fig 1) and were asked to select the ones they find useful to combat the stress induced by this COVID-19 Pandemic.



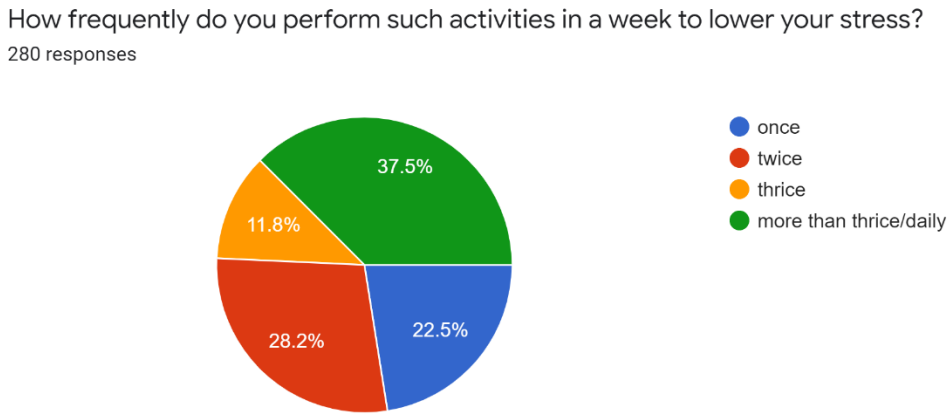
Source : original

Fig 1: Measures adopted by HCWs to combat stress induced by COVID-19

Interpretation:

As shown in figure 1: 172 respondents prefer listening to music, 139- reading books, 148 – spending time with family members, 162 – yoga/meditation/exercises, 98 – sports activities or games, 101 – dancing, 163 – talking to someone close to them and 59 prefer seeking medical help or taking pills as the measures to combat their stress at home/workplace.

6.3.2 Weekly Frequency Of Taking Measures To Combat Stress

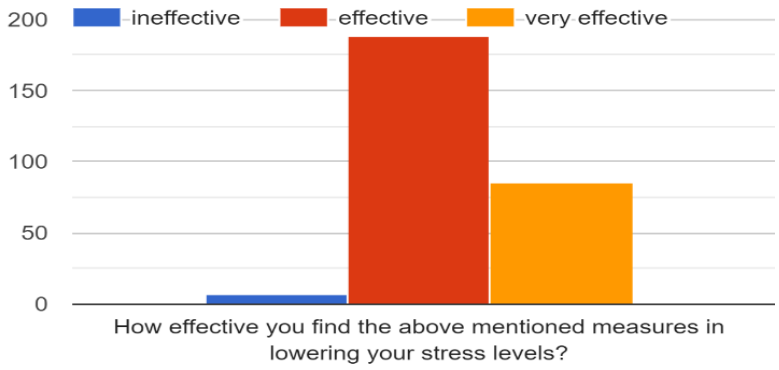


Source : original

Fig 2: How frequently HCWs perform these measures to lower stress

22.5 % HCWs prefer doing such activities once in a week, 28.2% twice, 11.8% thrice and 37.5% HCWs prefer doing it daily.

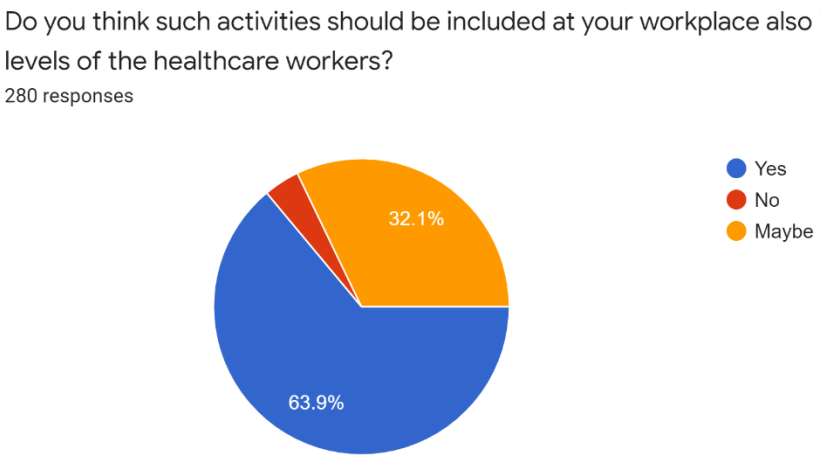
6.3.3 Effectiveness Of Such Measures In Lowering The Stress Levels



Source : original

Fig 3: perceived effectiveness of the measures adopted by the HCWs to lower the stress levels.

7 HCWs find such measures ineffective while 188 find them effective and 85 find them very effective in lowering the stress levels.



Source : original

Fig 4: Views about including those activities at workplace to lower stress levels

63.9 % HCWs feels that such activities should be included at workplace in order to lower the stress levels while 3.9% says they should not be included.

6.4 Views Of The HCWs On The Government Ordinance For The COVID Warriors

The ordinance says any person who attacks a health worker who is treating Covid-19 cases can be jailed for a maximum of seven years or fine up to Rupees 7 Lakhs.

The HCWs were asked to rate the effectiveness of the government ordinance for COVID Warriors, by choosing one option: (i) ineffective (ii) effective and (iii) very effective. 30 HCWs find the ordinance ineffective while 196 find it effective and 54 find it very effective.

7. Key Findings

- Most of the HCWs have a fear of getting COVID infection even after taking all the preventive measures.
- Around 80% of HCWs are afraid to go to their home as there is a chance of affecting their family members through their contact.
- Around 3/4th of the HCWs have a fear of stigmatization of rejection from the neighborhood due to hospital work.
- Most of the HCWs feel frustrated/ irritated because of increased workload due to COVID-19 pandemic.
- Most of the HCWs find it difficult to concentrate on their work due to this pandemic.
- Most of the HCWs agree that they find it difficult to fall asleep at night.
- Most of HCWs prefer to listen to music, talk to someone close, spending time with family, reading books of their choice, yoga, meditation and exercises to combat their stress over taking pills. Most of them find these measures effective as well in lowering their stress levels, and prefer to do it on regular basis.
- Most of the HCWs agree that the government ordinance for COVID Warriors is actually effective and beneficial for the HCWs.
- Other than the mental health issues HCWs are facing other issues like: insufficient salary, inadequate supply of PPE kits, and unavailability of transportation facility for the staff from the hospital end during lockdown period.

8. Conclusion & Recommendations

- There is a significant increase in stress levels of the healthcare workers due to the global pandemic of COVID-19.
- They are experiencing different symptoms like difficulty in sleeping, difficulty in concentration, feeling of frustration, anxiety and irritation due to increased workload.
- HCWs are afraid to visit their houses as the disease is highly contagious and there is no treatment available till now.
- Stigmatization of rejection from the society is also a big fear among the HCWs hence the contributing factor to cause stress.
- Maintaining positive self-attitude, spending time with family, talking to close ones, social support can play a big role in lowering the stress levels of the HCWs.

- Adequate supply of PPE kits is very essential for all the healthcare providers and also ensures the PPE stocks at each hospital and clinic.
- Adequate salary and support from hospital authorities is equally important to maintain a healthy and stress free work environment for the HCWs.
- Some interesting activities like yoga, meditation therapy and some fun activities can be introduced periodically at work place as it will help to divert the stressful mind and refresh the mood of healthcare workers and may help them feel positive and improve their overall performance.
- Infection control audits needs to be perform across the hospitals to check the scale of dangers the HCWs face during the pandemic. It is the duty of the government & society to maintain a healthy and stress free work environment for all the HCWs and appreciate their bravery and hard work, coz they are our shields in fighting this battle against COVID 19.
- Few amendments need to be made in HR policies for the HCWs especially regarding their leaves and salaries. If any HCW caught the COVID infection all the leaves should be paid regardless weather the employee have leaves (SL/CL/PL) left or not.

9. References

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Summer Training Report (PART 2)

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MBA (Hospital and health management)

2019-2021

IIHMR UNIVERSITY

Table of Contents

Acronyms/Abbreviations

1. DMAIC – Define-Measure-Analyze-Improve-Control
2. FMEA- Failure Mode and Effects Analysis
3. GR&R - Gage Repeatability & Reproducibility
4. JIT – Just In Time
5. MSA – Measurement System Analysis
6. PDCA – Plan Do Control Act
7. SIPOC - Supplier Input Process Output Customer
8. SWOT – Strength, Weakness, Opportunity, Threat
9. USG - University System of Georgia

SIX SIGMA YELLOW BELT SPECIALIZATION

- **Offered by: University System of Georgia on Coursera**

Introduction: This Six Sigma Yellow Belt Specialization is to learn more about the basic components of Six Sigma and Lean. Six Sigma skills are widely sought by employers both nationally and internationally. These skills have been proven to help improve business processes, performance, and quality assurance. This specialization on **Coursera** is offered by **University System of Georgia**

The University System of Georgia is composed of 28 higher education institutions including 4 research universities, 2 regional universities, 12 state universities, 13 state colleges and the Skidaway Institute of Oceanography. The Georgia Public Library System, encompassing 61 library systems throughout Georgia, is also part of the University System.

This specialization, is about the learning of proven principles and tools specific to **six sigma** and **lean**.

This is a sequential, linear designed specialization that covers the introductory level content (at the "yellow belt" level) of Six Sigma and Lean. Yellow Belt knowledge is needed before advancing to Green Belt (which is a second specialization offered here on Coursera by the USG). Green Belt knowledge is needed before moving to a Black Belt.

The proper sequence of this specialization is:

Course #1 - Six Sigma Fundamentals

Course #2 - Six Sigma Tools for Define and Measure

Course #3 - Six Sigma Tools for Analyze

Course #4 - Six Sigma Tools for Improve and Control

At the end of Course #4 (Six Sigma Tools for Improve and Control), there is a peer-reviewed, **capstone project**. Successful completion of this project is necessary for full completion of this specialization.

Objectives of the course:

- Communicate using Lean Six Sigma concepts.
- Relate Lean Six Sigma concepts to the overall business objectives.
- Use the five-step D-M-A-I-C model to improve processes.
- Participate in the development or refinement of a project charter.
- Build and understand process maps, Pareto charts, affinity diagrams, trend charts, control charts, and histograms.
- Identify the root cause of a problem.
- Use a failure mode and effects analysis to set priorities for improvement.
- Document process changes and use a control plan to prevent backsliding.

Course content:

The specialization consists of 4 courses as mentioned:

1. **Six Sigma Fundamentals**
2. **Six Sigma Tools for Define and Measure**
3. **Six Sigma Tools for Analyze**
4. **Six Sigma Tools for Improve and Control**

Each course is divided into 4 modules, and there is 1 week for each module . the last has an additional extension of 1 week which is for the Capstone Project. Details of the modules for each course are as follows:

1. Six sigma fundamentals:

Week 1: Six Sigma Foundations, Principles, Roles and Responsibilities

In this module you will be introduced to the foundations of Six Sigma, the purpose of lean, and the value to the organization as a whole. The content includes:

11 videos

What is Quality - Origins of Six Sigma - David Cook
Six Sigma Foundations and Principles
Purpose of Six Sigma
Six Sigma Methodology
Evolution of Six Sigma
Value of Six Sigma
Individual Contributors
Yellow and Green Belt
Roles and Responsibilities of Black Belts
Role of Master Black Belts
Role of Champions

3 readings

Six Sigma Foundations and Principles - Recommended Reading
Six Sigma Roles and Responsibilities - Recommended Reading

4 practice exercises

Six Sigma Foundations and Principles Practice
Six Sigma Foundations and Principles Quiz
Six Sigma Roles and Responsibilities Practice
Six Sigma Roles and Responsibilities Quiz

Week 2: Quality Tools and Six Sigma Metrics

In this module Dr. Bill Bailey introduced to the different types of **quality tools** as well as important Six Sigma **metrics** that can be used throughout the **DMAIC** process. Quality tools and metrics are a critical tool for process improvement. This module will introduce to some of the most common quality tools as well as the most important Six Sigma metrics. The content of this week is as follows:

10 videos

Introduction to Quality Tools

Pareto Charts

Cause and Effect Diagrams

Flow Charts and Process Mapping

Checksheets

Scatter Diagrams

Histogram

Six Sigma Measure - pt

Six Sigma Measure - pt

Cost of Poor Quality

5 readings

Intro to Quality Tools - Recommended Reading

Flow Charts and Process Mapping - Recommended Reading

Scatter Diagrams - Recommended Reading

Six Sigma Metrics - Recommended Reading

Cost of Poor Quality - Recommended Reading

1 practice exercise

Quality Tools and Six Sigma Metrics Quiz

Week 3: Team Basics

Teamwork is an essential component of successful quality improvement work. Many successful organizations have leaders who work in teams. In this module you will learn about why teams are so important to the Six Sigma process, the different types of teams and their

different objectives, the different stages of team development, decision making methods for use in teams, and team communication methods. The content of this module are as follows:

6 videos

Importance of Teams

Types of Teams

Stages of Team Development

Brainstorming

Team Decision-Making

Agendas, Minutes, and Status Reports

4 readings

Types of Teams - Recommended Reading

Stages of Team Development - Recommended Reading

Decision Making Tools - Recommended Reading

Communication Methods - Recommended Reading

2 practice exercises

Team Basics Practice

Team Basics Graded Quiz

Week 4: Lean Foundations and Principles

In this module you will be introduced to the purpose of lean and its methodologies. You will learn about the value of lean to an organization. This module will build off of what you have learned in the previous modules and help you to better understand how to better serve customers. The content of this module are as follows:

6 videos

Purpose of Lean

Value Stream Mapping

Interview: Real World Value Stream Mapping

JIT & KanBan

Poka Yoke

Value to the Organization

6 readings

Purpose of Lean - Recommended Reading

Useful Resources

Value Stream Mapping - Recommended Reading

JIT and Kan Ban - Recommended Reading

Poka Yoke - Recommended Reading

Value to the Organization - Recommended Reading

2 practice exercises

Lean Foundations and Principles Practice Quiz

Lean Foundations and Principles Graded Quiz

2. Six sigma Tools for Define And Measure

Week 1: Project Identification

This module will introduce you to the process of project development and selection. The first phase of the DMAIC process is the Define phase which begins with project identification and proceeds onto project management. When identifying Six Sigma projects it is important to ensure that resources and time are used in the most effective and productive way. In this module you will learn about the importance of customer and stakeholder needs in relation to project development. The content are as follows:

8 videos

Voice of the Customer

Critical to Satisfaction

Quality Function Deployment

Project Selection

SWOT Analysis

Identifying Stakeholders
Process Identification
SIPOC

2 readings
Highly-Recommended Text
Project Identification - Recommended Reading

2 practice exercises
Project Identification Practice Quiz
Project Identification Graded Quiz

Week 2: Project Management Basics

This module will cover the basics of project development and management. You will be introduced to many common aspects of a project plan as well as tools for managing your project. These tools include activity network diagrams, affinity diagrams, tree diagrams, relations charts, and matrix charts. Project Management is the second aspect of the Define phase in the DMAIC process of Six Sigma.

5 videos
Defining the Problem Statement
Developing a Project Plan
Brainstorming & Diagramming Tools
Other Project Planning Tools
Six Sigma Phase Reviews

4 readings
Defining the Problem Statement - Recommended Reading
Developing a Project Plan - Recommended Reading
Other Project Planning Tools - Recommended Reading
Six Sigma Phase Reviews - Recommended Reading

2 practice exercises

Project Management Basics Practice

Project Management Basics Graded Quiz

Week 3: Basic Statistics

The next phase of the DIMAC process is the Measure phase. We will begin by exploring basic statistics and its significance to Six Sigma. This module will introduce you to the measures of variance, range, standard deviation, center, mean, median, and mode. You will also learn how to interpret these measures using given data sets. The content are as follows:

2 videos

Basic Statistics

1 reading

Basic Statistics - Recommended Reading

2 practice exercises

Basic Statistics

Week 4: Data Collection

The second aspect of the Measure phase is Data Collection. In the previous module we learned about statistics and how to use data for different needs. In this module we will learn different techniques on how to collect data, the reasons for collecting data, and ensuring data accuracy and integrity. The content of this module are as follows:

3 videos

Data Collection

1 reading

Data Collection

2 practice exercises

Data Collection Practice Quiz

Data Collection Graded Quiz

3. Six Sigma Tools for Analyze

Week 1: Measurement system analysis

This module will introduce you to Measurement System Analysis (MSA) which is a key component of the Measure phase of the DMAIC process. You will also learn about Gauge Repeatability & Reproducibility (GR&R) and why it is used in the measurement phase. The content includes:

2 videos

Measurement System Analysis Part

Measurement System Analysis Part

3 readings

Highly-Recommended Text

Measurement System Analysis - Recommended Reading

Gage Repeatability & Reproducibility - Recommended Reading

2 practice exercises

Measurement System Analysis Practice

Measurement System Analysis Practice Graded Quiz

Week 2: Process Analysis Tools

This module will introduce you to the Analysis phase of the DMAIC process. Process analysis helps you to better understand current processes and how they can be improved. You will be introduced to many of the different process analysis tools that are commonly used by

Six Sigma experts. Failure Mode and Effects Analysis (FMEA) will also be introduced to help you better understand how to identify process failures. The content are as follows:

6 videos

Process Analysis Tools

Eliminating Waste

5S

FMEA Part

FMEA Part

FMEA Part

4 readings

Eliminating Waste and 5S - Recommended Reading

FMEA Pt. 1 - Recommended Reading

FMEA Pt. 2 - Recommended Reading

FMEA Gift - Recommended Reading

2 practice exercises

Process Analysis Tools Practice

Process Analysis Tools

Week 3: Root Cause Analysis

Root cause analysis is a common problem solving step. Determining the root cause of something is an important aspect of uncovering the causes of a problem. In this module you will review the different tools used in determining root cause including 5-whys, process mapping, force-field analysis, and matrix charts. The content are as follows:

5 videos

Root Cause Analysis

5 Whys

Process Mapping

Force Field Analysis

Matrix Charts

4 readings

5 Whys - Recommended Reading

Process Mapping - Recommended Reading

Force Field Analysis - Recommended Reading

Matrix Charts - Recommended Reading

2 practice exercises

Root Cause Analysis Practice

Root Cause Analysis Graded Quiz

Week 4: Data Analysis

In this module you will be diving into the statistical side of Six Sigma. You will begin with learning about the basic distribution types which include normal and binomial. You will then proceed to variation and will learn the difference between common and special cause variation. The content is as follows:

7 videos

Characteristics of Probability Distributions

Calculating Probabilities Using the Normal Distribution

Calculating Probabilities in the Normal Distribution: Example Problems

The Binomial Distribution

Binomial Distribution Calculations

Binomial Distribution Calculations: More Examples

Common Versus Special Cause Variation

4 readings

Characteristics of Probability Distributions - Recommended Reading

The Normal Distribution Table

The Binomial Distribution - Recommended Reading

Common Versus Special Cause Variation - Recommended Reading

2 practice exercises

Data Analysis Practice Quiz

Data Analysis Graded Quiz

4. Six Sigma For Improve And Control

Week 1: Correlation and Regression

This module will continue to discussion analysis by explaining correlation and regression. You will learn the meaning of correlation and regression, the different types of analysis, and how it can be used in Six Sigma. The content are as follows:

5 videos

Dependent and Independent Variables

Types of Correlation

The Regression Equation

Use of Regression for Prediction

Regression for Six Sigma

4 readings

Highly-Recommended Text

Dependent and Independent Variables and Types of Correlation - Recommended Reading

The Regression Equation - Recommended Reading

Regression for Six Sigma - Recommended Reading

2 practice exercises

Correlation and Regression Practice

Correlation and Regression Graded Quiz

Week 2: Hypothesis Testing

This the final module that covers the Analysis phase of the DMAIC process. Now that you have collected the data and calculated it you will need to determine how to make a statistical conclusion about your findings. In this module you will learn more about the importance of hypothesis testing, how to correctly do a hypothesis test reading as well as how to avoid errors, and statistical significance. The content of the module are as follows:

5 videos

Hypothesis Testing Basics
Types of Errors
Types of Error Examples
How To Do A Hypothesis Test
P-value and Statistical Significance

4 readings

Hypothesis Testing Basics - Recommended Reading
Types of Errors and Power - Recommended Reading
How to do a Hypothesis Test - Recommended Reading
P-value and Statistical Significance - Recommended Reading

2 practice exercises

Hypothesis Testing Practice Quiz
Hypothesis Testing Graded Quiz

Week 3: Improvement Techniques:

This module will introduce you to the Improve and Control phase of the DMAIC process. The first step in this phase is determining improvement techniques to help make improvements to an organization. This module will cover the best and most popular improvement techniques including kaizen and kaizen blitz, PDCA (Plan-Do-Check-Act) cycle, and cost benefit analysis (including cost of quality). The content are as follows:

6 videos

Introduction

Suboptimization

Kaizen and Kaizen Blitz

PDCA

Cost Benefit Analysis

Cost of Quality

5 readings

Kaizen and Kaizen Blitz - Recommended Reading

PDCA - Recommended Reading

Cost Benefit Analysis - Recommended Reading1

Cost of Quality - Recommended Reading

Tip of the Iceberg - Recommended Reading

2 practice exercises

Improvement Techniques Practice Quiz20m

Improvement Techniques Graded Quiz20m

Week 4: Control Tools And Documentation

The final phase of the DMAIC process is the control phase. In this module you will learn about control tools that are useful in maintaining improvements. Communication is a key component of the control phase therefore it is important to develop standardized documentation. You will learn about how to standardize and manage documentation to help maintain processes that were implemented during the improve phase of DMAIC. The content are as follows:

3 videos

Control Charts Part

Control Charts Part

Document Management

1 reading

Control Tools and Documentation - Recommended Reading

2 practice exercises

Control Tools and Documentation Practice

Control Tools and Documentation Graded Quiz

Week 5: Capstone Project For Completion Of Six Sigma Yellow Belt Specialization

This module is the "capstone project."

Learning methodology of the course:

This specialization used the following materials for learning:

- Course Videos & Readings
- Lectures
- Practice Quizzes
- Graded Assignments with Peer Feedback (included developing process map, affinity charts and data assignments)
- Graded Quizzes with Feedback (mandatory to score 80 % or above to pass)
- Graded Capstone Project with Peer Feedback: Mandatory project for the completion of the specialization where Learners will create a plan for a six sigma, department or process level project that includes the following:

1. Project Charter (completed template document)

2. Team Charter (completed template document)

3. Data Collection plan

4. Process Map

5. Hypotheses

Key Learning From The Course: The learning from this specialization revolves around the **D-M-A-I-C** process of Six Sigma.

D- Define, M- Measure, A- Analyze, I- Improve & C- Control.

Step 1: Define the problem.

- First identify the problem.
- What problem the organization is facing and how it is affecting the company.
- A SIPOC (Supplier, Input, Process, Output and Customer) diagram which gives an overview of the process that is to be analysed to find out the problem.
- Process map is outlined. Process map is a picture of sequence of steps in a process by symbols.

Step 2: Measure the problem

- The extent of the problem should be measured. For that the current state of the problem is need to be examined to know the performance.

I. Brainstorming

II. SWOT Analysis

Step 3: Analyse the problem

- To analyse the problem following six sigma tools can be used:

I. Pareto charts

II. Histograms

III. Check sheets

IV. Cause-Effect diagrams

V. Process analysis tool:

- Value analysis- lean = systematically eliminating wastes
- **5S: 5S stands for Sort, Set in Order, Shine, Standard, Sustain**
- **5 Whys**

STEP 4: IMPROVE PHASE

Develop , implement and evaluate solutions for the root cause:

I. Impact effort matrix

II. PDCA- Plan, Do, Check, Act

STEP 5: CONTROL PHASE

- For the future maintenance of the improvements
- Using a control chart.