

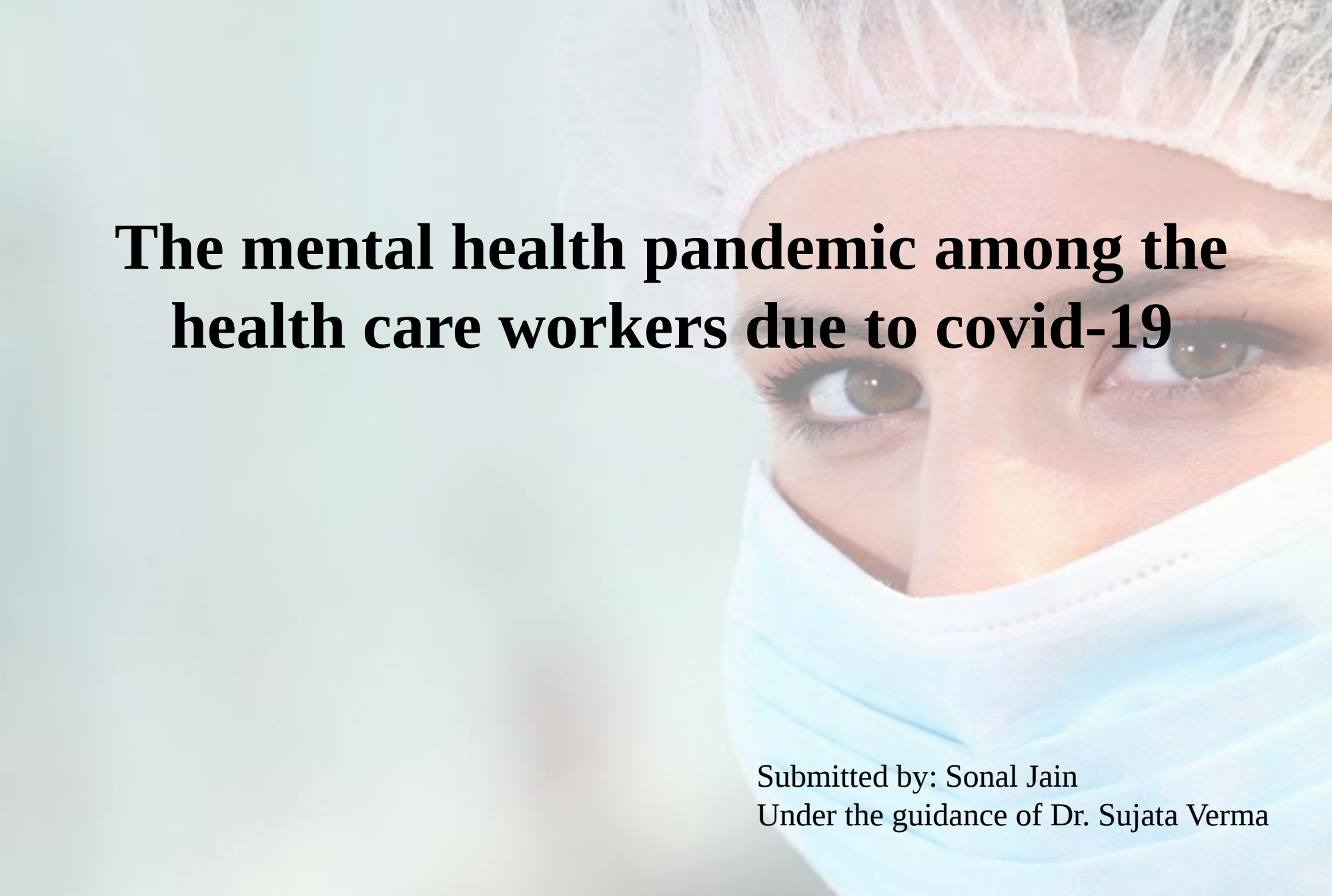
Summer Training Report (Part 1)

By Sonal Jain

MBA (Hospital and health management)

2019-2021

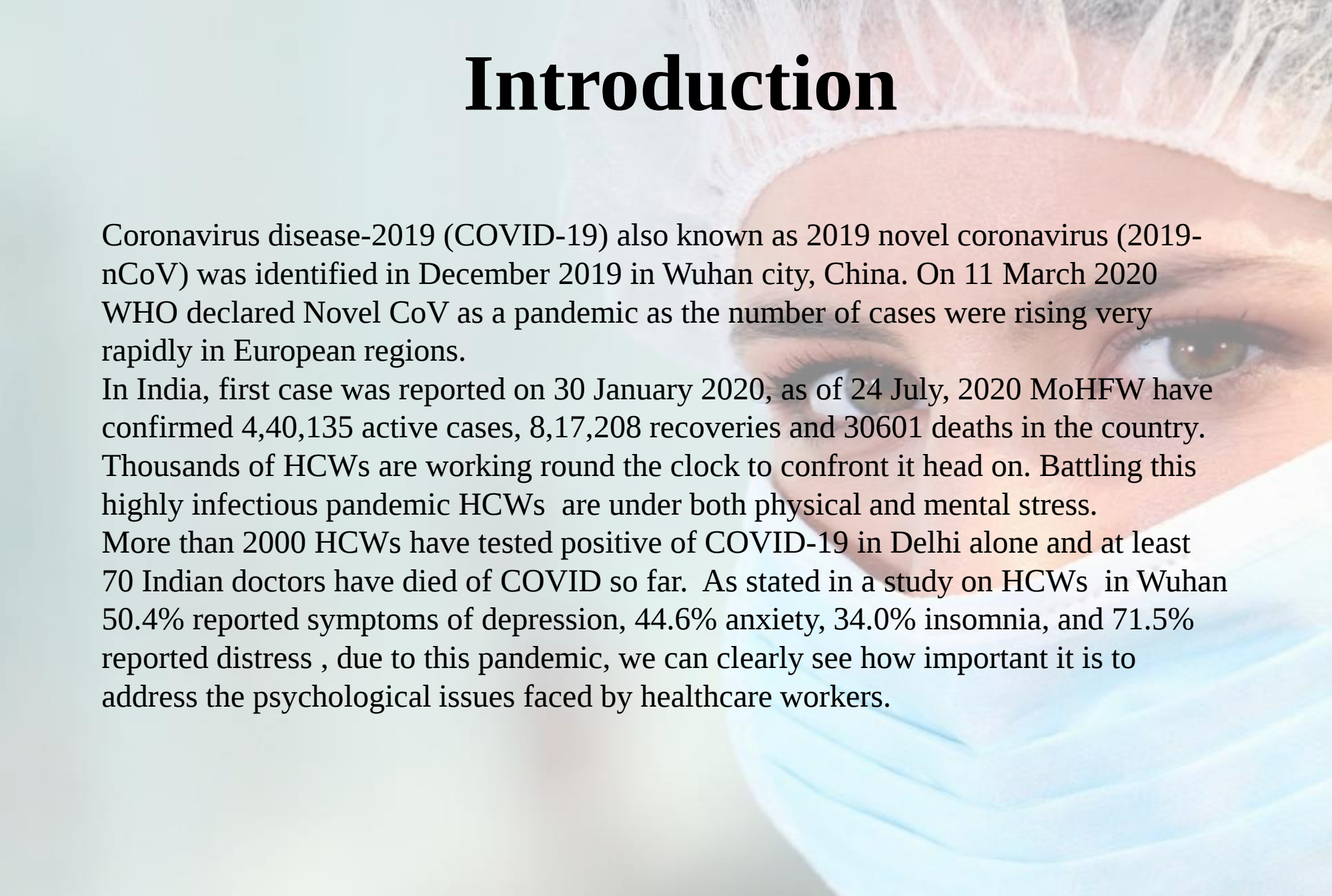




The mental health pandemic among the health care workers due to covid-19

Submitted by: Sonal Jain
Under the guidance of Dr. Sujata Verma

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 Novel 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

Title	Year /Location	Author	Key findings
Psychological symptoms among frontline healthcare workers during COVID-19 outbreak	2020 Wuhan	Jiang Du et al	Study 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.
Psychological Impact and Coping Strategies of Frontline Medical Staff in Hunan Between January and March 2020 During the Outbreak of Coronavirus Disease 2019 (COVID-19)	2020 Hubei	Hozheng Cai, et al	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. 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.
Issues relevant to mental health promotion in frontline health care workers in managing isolated and quarantined COVID 19patients.	2020 North India	Ritin Mohindra	The Sample size wasn't specified. qualitative analysis approach and identified main themes for mental health promotion of HP as follows: Positive Motivational factors a. Intellectual b. Emotional Negatives, frustrations associated with patient care Personal fears and annoyances experienced by doctors
The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus	2020 Wuhan	Lejung Kang	A Cross-Sectional study Conducted on 994 medical doctors and nurses 36.9% had sub threshold mental health disturbances, 34.4% had mild disturbances, 22.4% had moderate disturbances, and 6.2% had severe disturbances.
Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019	2020 Wuhan	Jianbo Lai	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. 1257 HCW that included 20 hospitals in Wuhan 50.4% reported symptoms of depression, 44.6% anxiety, 34.0% insomnia. and 71.5% reported distress.

Objectives

1.

- To study the present mental health condition of the frontline medical health workers.

2.

- To study the perceived stress levels among the frontline healthcare workers.

3.

- To study the different strategies adopted by the frontline healthcare workers to manage the stress induced by this crisis

Methodology

- 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, and support staff who all are at the highest risk of exposure to COVID-19 infection.
- Study design: Cross Sectional Study
- Sampling method: PPS probability to proportional to size as per Delhi health care worker population.
- Primary data collected by conducting online survey using a questionnaire. The questionnaire was circulated in the form of Google forms to the target population using different social media.
- Secondary data on number of cases of COVID-19 and frontline workers in Delhi was collected from 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 using Ms Excel and graphical presentations.

Sampling

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

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:

$$n = \frac{z^2 \cdot p \cdot q}{d^2}$$

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

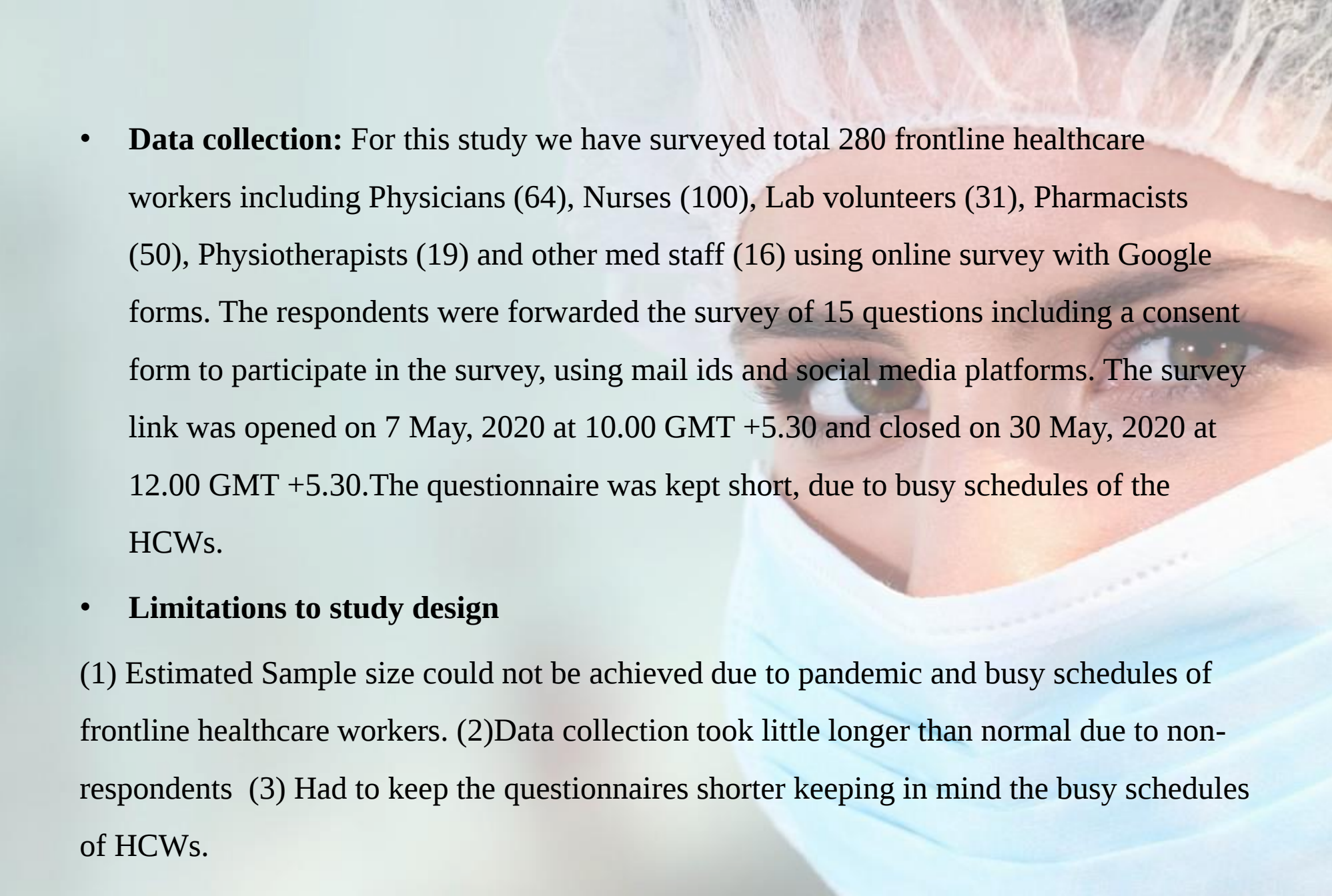
Lab volunteers: 350/40 sample

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 to 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 questionnaires shorter keeping in mind the busy schedules of HCWs.

Analysis and interpretation

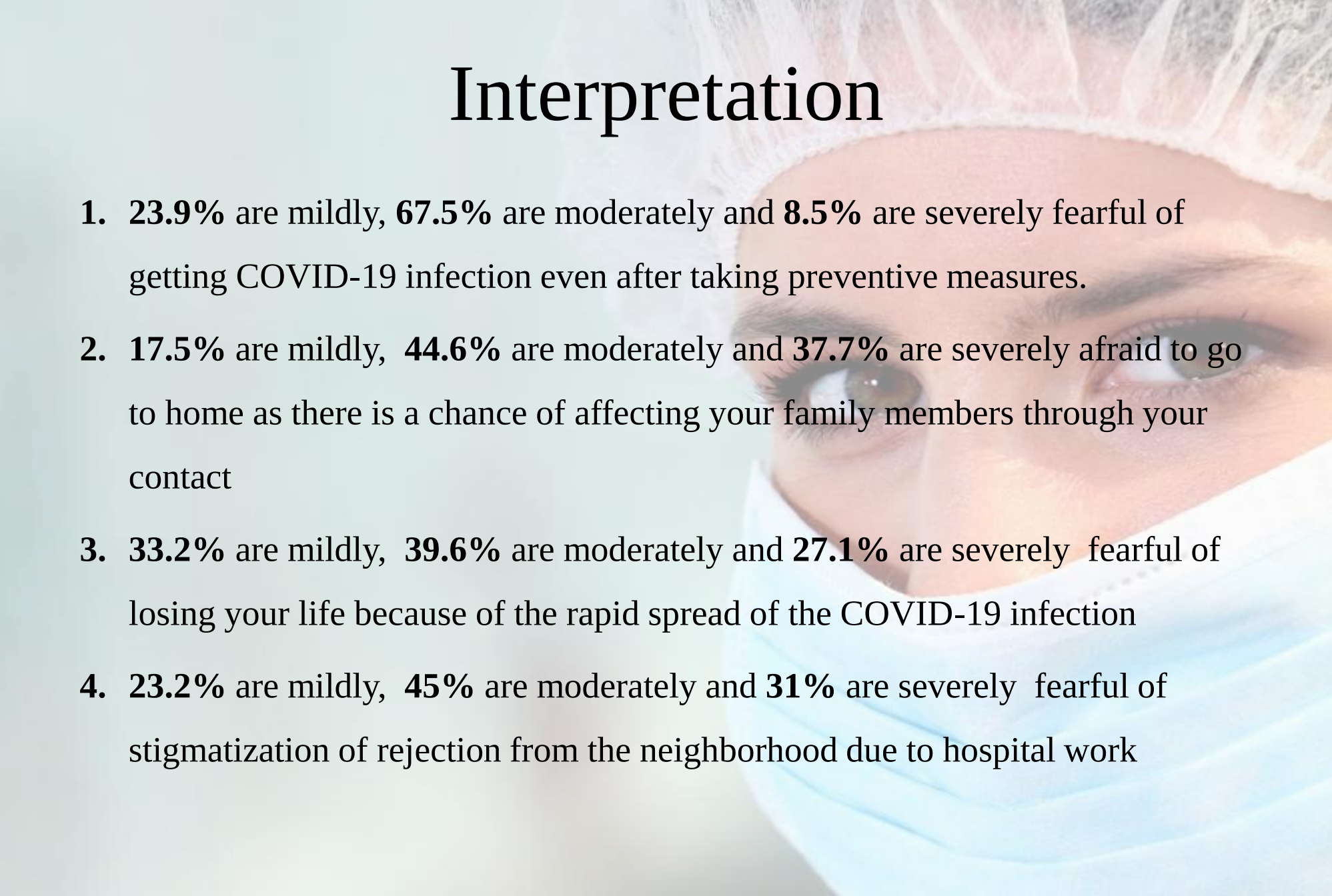
I. Assessment Of Fear Of Getting COVID-19 Infection Among The Frontline Healthcare Workers

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

QUESTIONS	Mild	Moderate	Severe
• Fear of getting corona virus infection, even after taking all the preventive measures?	67	189	24
• Afraid to go to home as there is a chance of affecting your family members through your contact	49	125	106
• Fear of losing your life because of the rapid spread of the COVID-19 INFECTION?	93	111	76
• Fear of stigmatization of rejection from the neighborhood due to hospital work	65	126	89

Source: original

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

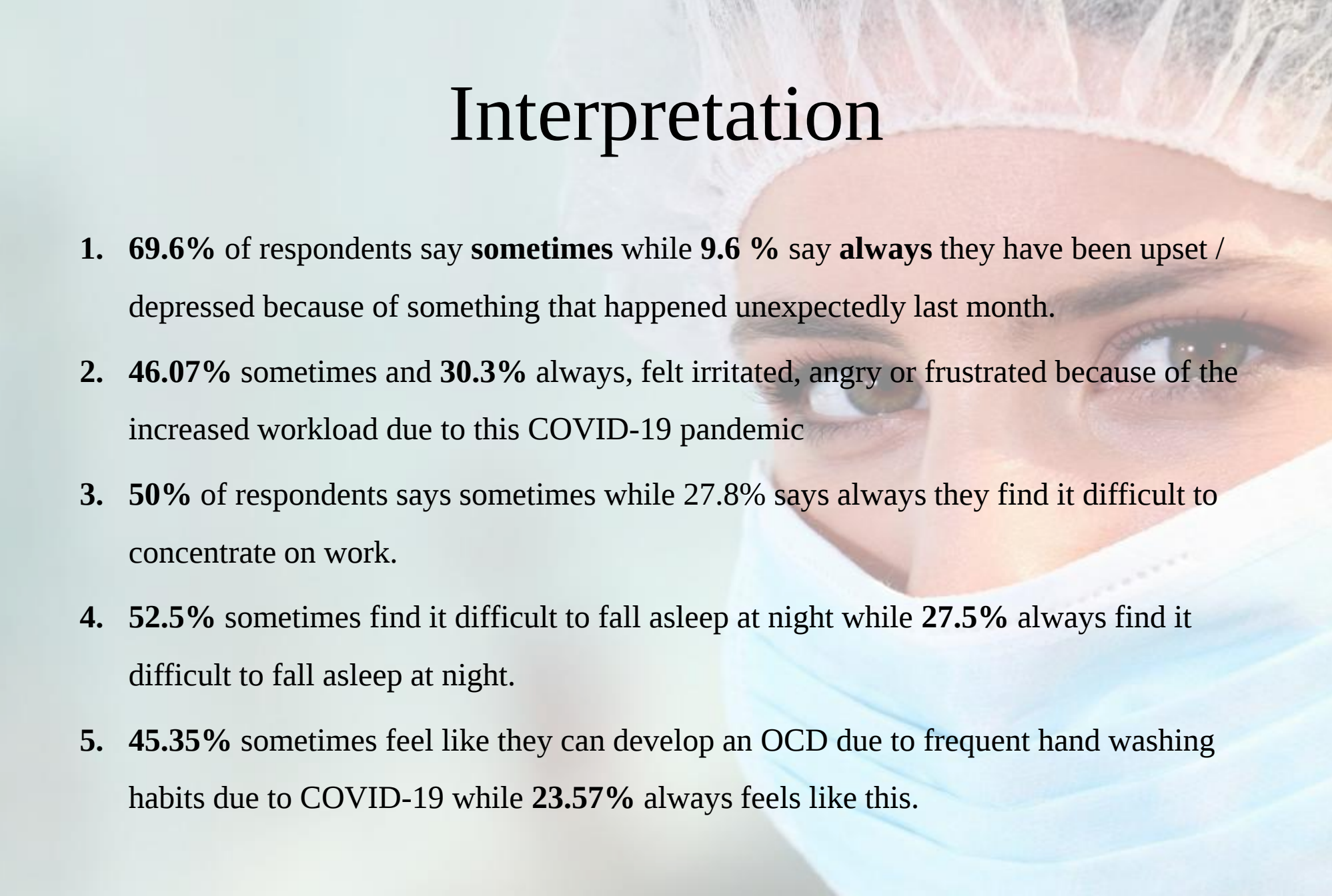
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II. Assessment Of Perceived Stress Levels Among Frontline Health Care Workers Due To Covid-19

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

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

Interpretation

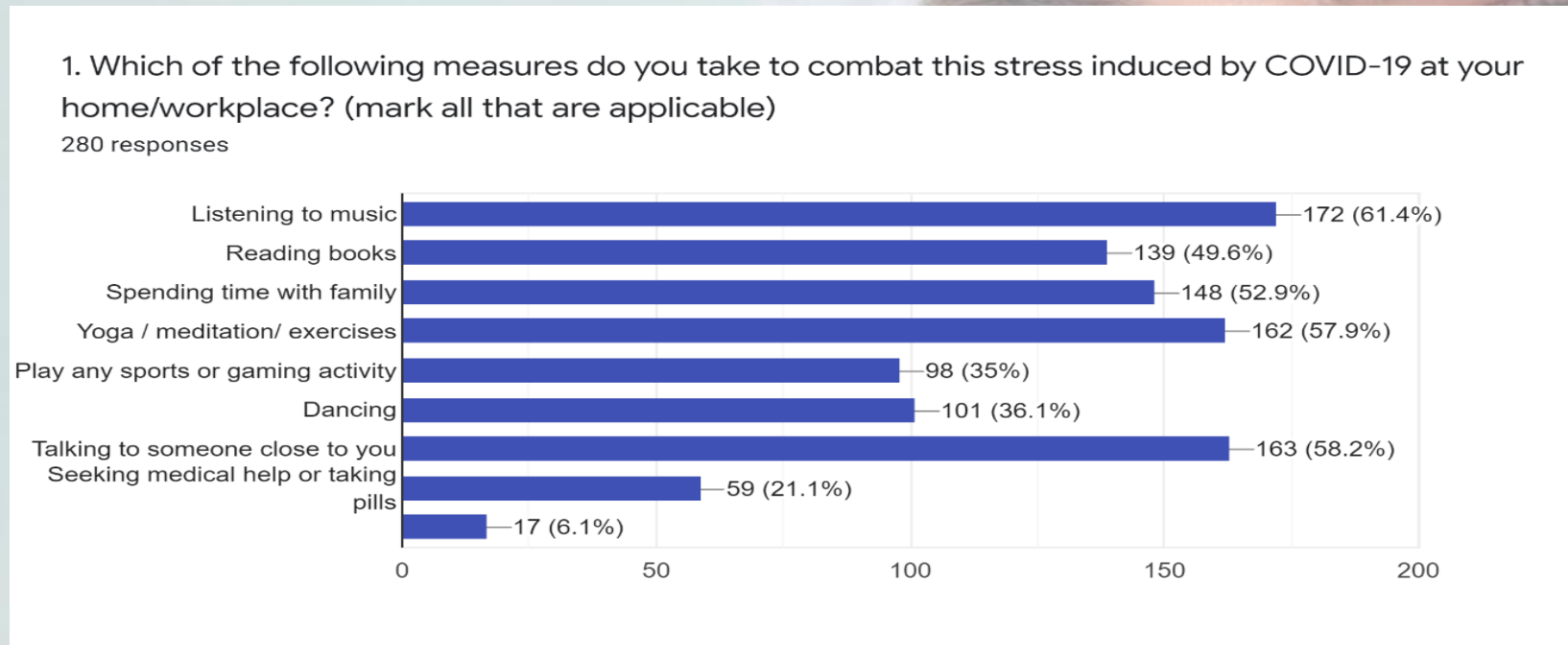


1. **69.6%** of respondents say **sometimes** while **9.6 %** say **always** they have been upset / depressed because of something that happened unexpectedly last month.
2. **46.07%** sometimes and **30.3%** always, felt irritated, angry or frustrated because of the increased workload due to this COVID-19 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.

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

A. 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.

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

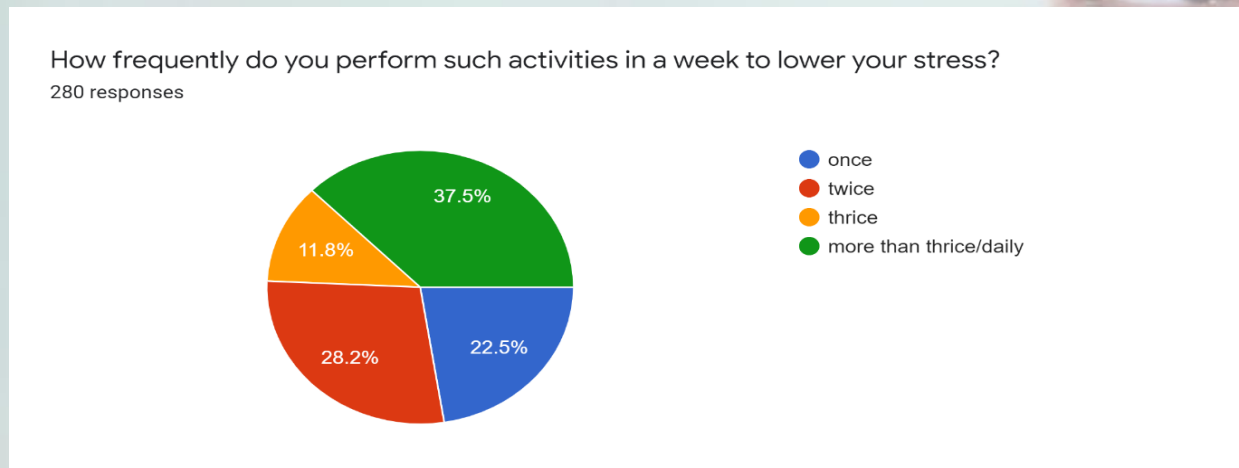


Source : original

- **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.

B. Weekly Frequency Of Taking Measures To Combat Stress



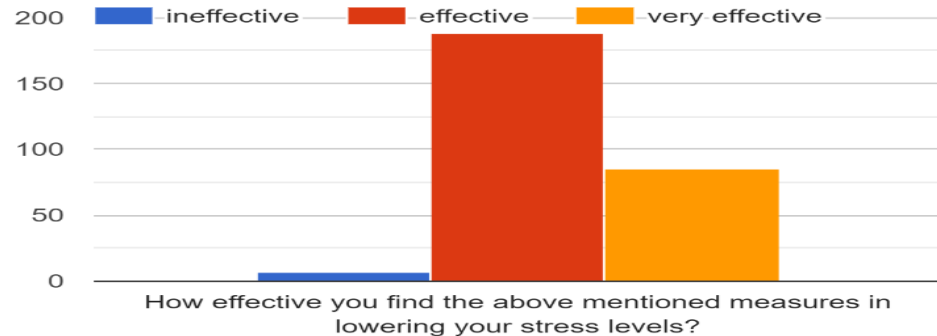
Interpretation:

As shown in fig 2, 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.

Fig 2: Frequency to perform these measures by HCWs

Source :original

C Effectiveness Of Such Measures In Lowering The Stress Levels



As shown in fig 3, 7 HCWs find such measures ineffective while 188 find them effective and 85 find them very effective in lowering the stress levels.

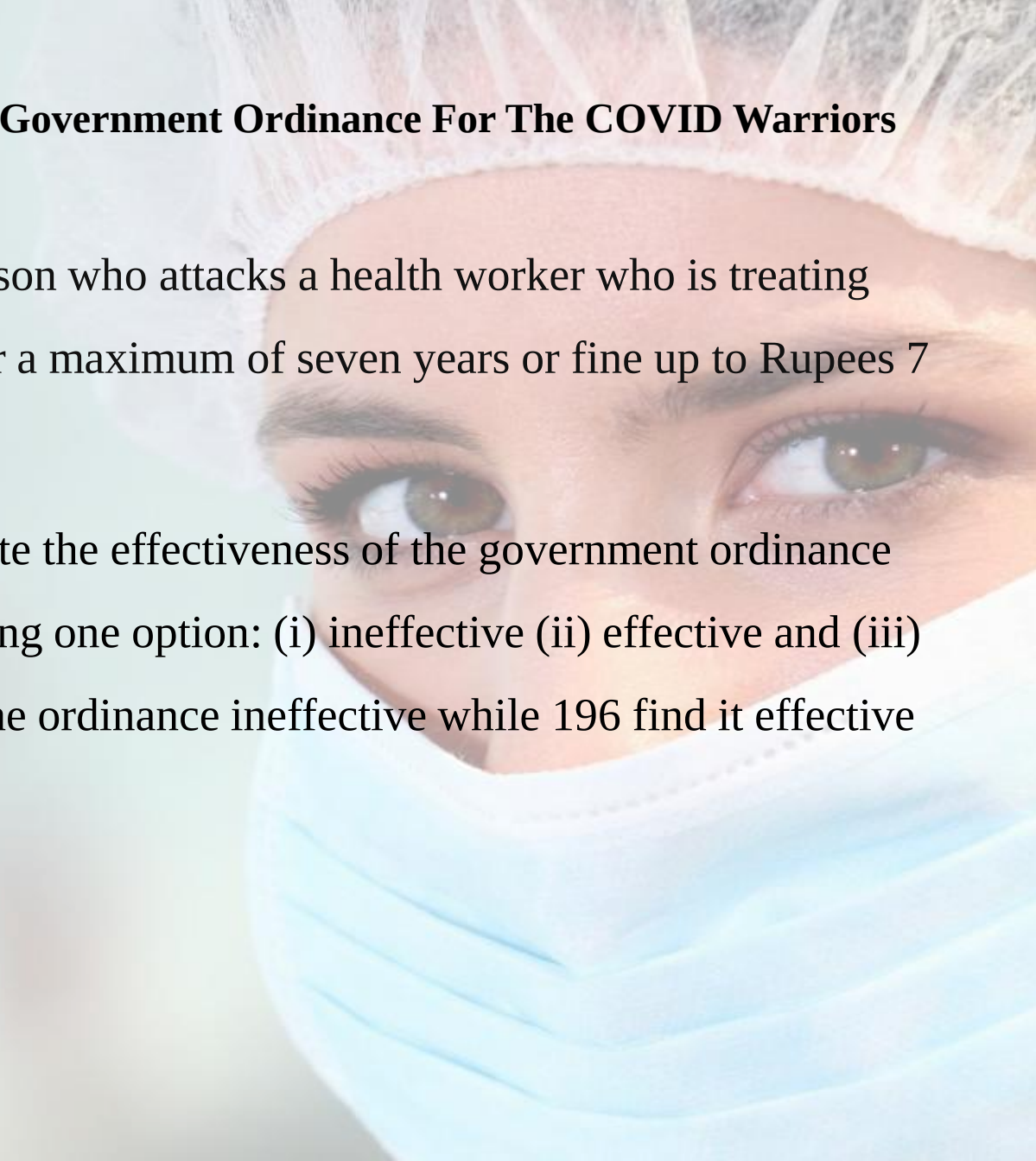
Fig 3: perceived effectiveness of the measures adopted by the HCWs to lower the stress levels.

Source : original

- 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 and 32.1 % are not sure about it.

IV. 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.

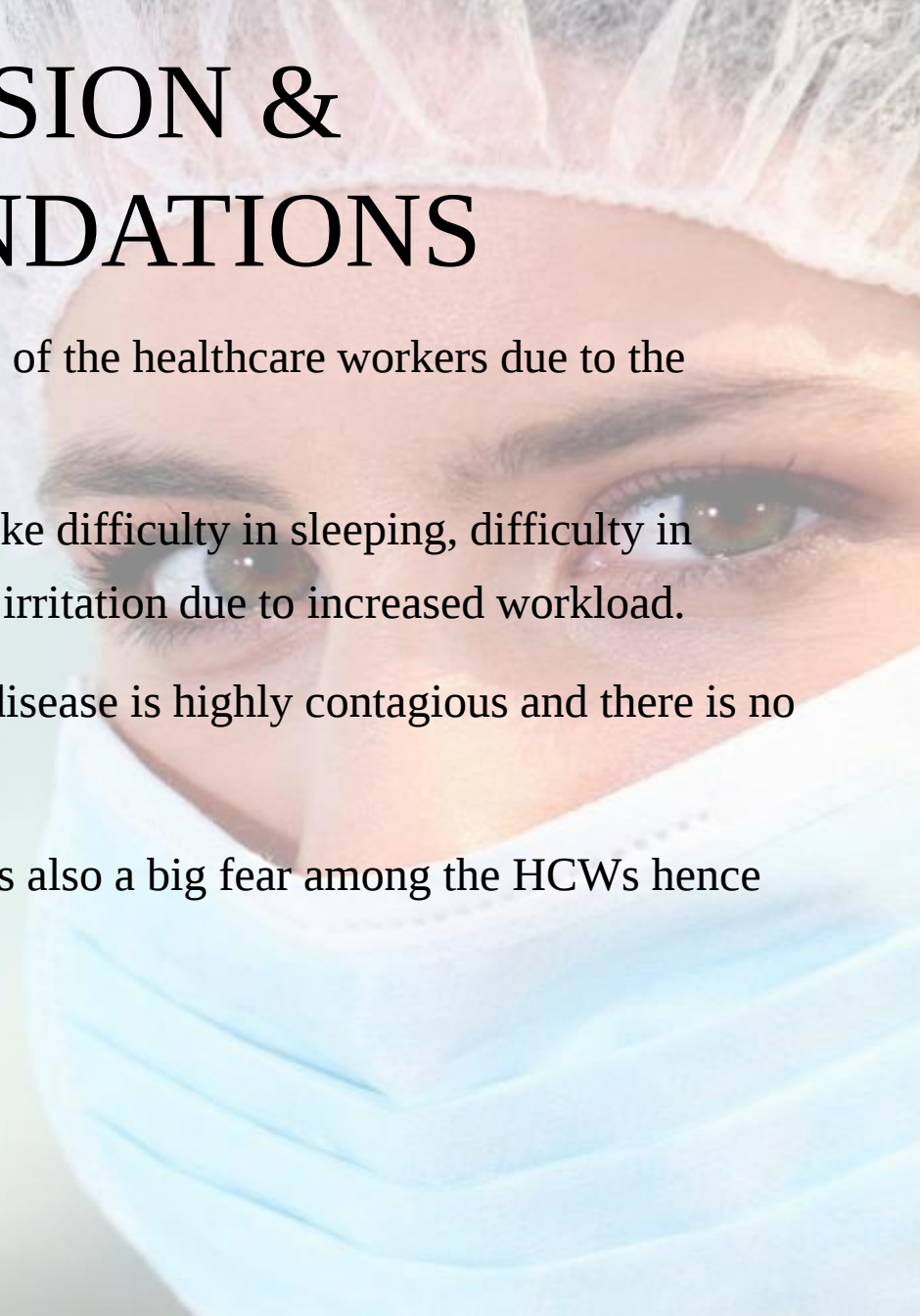


Key Findings

- 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.

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.



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- 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.
- Health professionals should be encouraged to practice stress management techniques
- Adequate supply of PPE kits is very essential for all the healthcare providers and also ensure the PPE stocks at each hospital and clinic.
- Government can provide conveyance facility to those COVID warriors who don't possess any personal vehicle, specially at the time lockdown
- 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.

Current Government policies for HCWs fighting against COVID

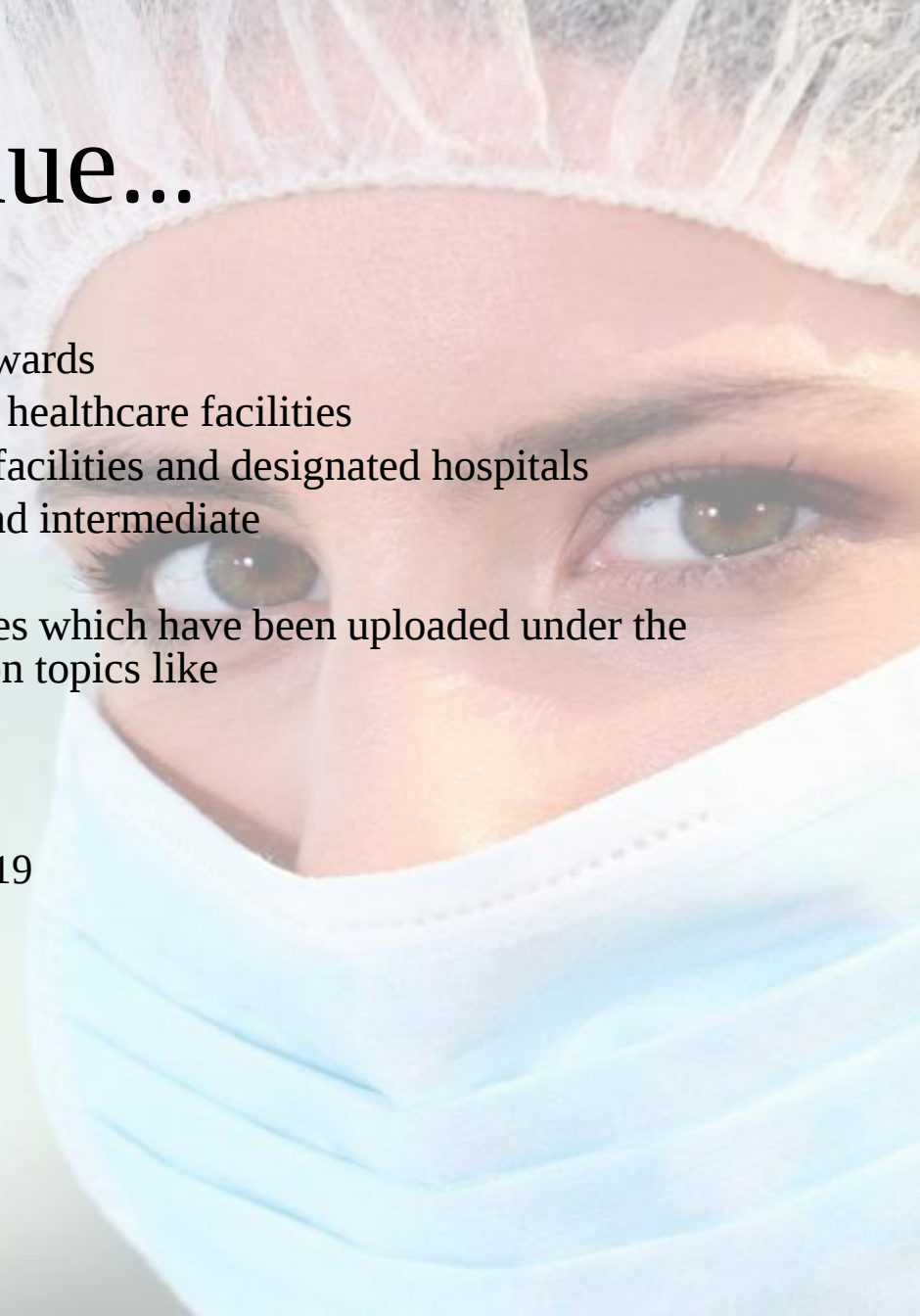
- The government has approved the insurance scheme for the healthcare workers fighting novel coronavirus. The government has announced a Rs. 50 lakhs insurance cover per person for frontline HCWs involved in managing the COVID-19 outbreak. Scheme would include:
 - Sanitation staff
 - Doctors
 - Nurses
 - Paramedics
 - Asha workers
- An SOP for allocation of Residents/PG Students and Nursing Students hospital of COVID.19 has also been issued placed as part of management
- For the purpose of medical safety Department of Health Research (DHR) & Indian Council for Medical Research (ICMR) has recommended the SARSCoV.2 infection for high use of hydroxy-chloroquine for prophylaxis of risk population including all asymptomatic healthcare workers involved in the COVID.19 care of suspected or confirmed cases of COVID-19.
- Since there were no domestic manufacturers of PPEs in the country, the MoHFW in collaboration with Ministry of Textiles worked to encourage domestic production. More than 50 domestic manufacturers have cleared quality tests so far and orders for nearly 1 Crore PPEs have been placed with them.

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- A dedicated toll free helpline:08046110007, for providing psycho-social support for health care workers has been created by using suitable professionals including Psychiatry department residents
- Online training and webinars for Physicians and Nursing personnel is being conducted by AIIMS, Delhi INC on management of patients with COVID 19 , septic shock, ventilation strategy, management of aerosol generating medical procedures, infection and prevention control practices Psychological care of patients etc. A total of 6 lakhs views have been recorded as on 20.04.2020.
- MoHFW has finalized and issued several guidelines and training material for Frontline healthcare workers on MoHFW website, such as
 - a) Pocket book for frontline health workers
 - b) Facilitators guide for trainers of frontline workers
 - c) SOPs for transporting a suspect confirmed case of COVID-19
 - d) Guidelines for disinfection of public places
 - e) Guidelines for COVID waste disposal
 - f) Advisory to start rapid antibody based blood test for COVID-19
 - g) Guidelines for specimen collection, packaging and transportation for SARS CoV 2
 - h) Guidelines for rational use of PPE

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- j) Guidelines for testing in private labs in India
- k) Guidelines for setting up of isolation facility wards
- l) Guidelines for infection prevention control in healthcare facilities
- m) Guidelines for use of IEC and general health facilities and designated hospitals
- n) Training on incident response system basic and intermediate
- o) Guidelines for quarantine facilities
- Currently, there 12 courses in different languages which have been uploaded under the MoHFW tab on the website including courses on topics like
 - a) Basics of covid-19
 - b) Quarantine and isolation
 - c) Infection prevention through PPE
 - d) Psychological care of patients with COVID-19
 - e) Infection prevention and control
 - f) Laboratory sample collection and testing
 - g) Clinical management of covid.19
 - h) Management of covid19
 - i) ICU care and ventilation management



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Summer Training Report (Part 2)

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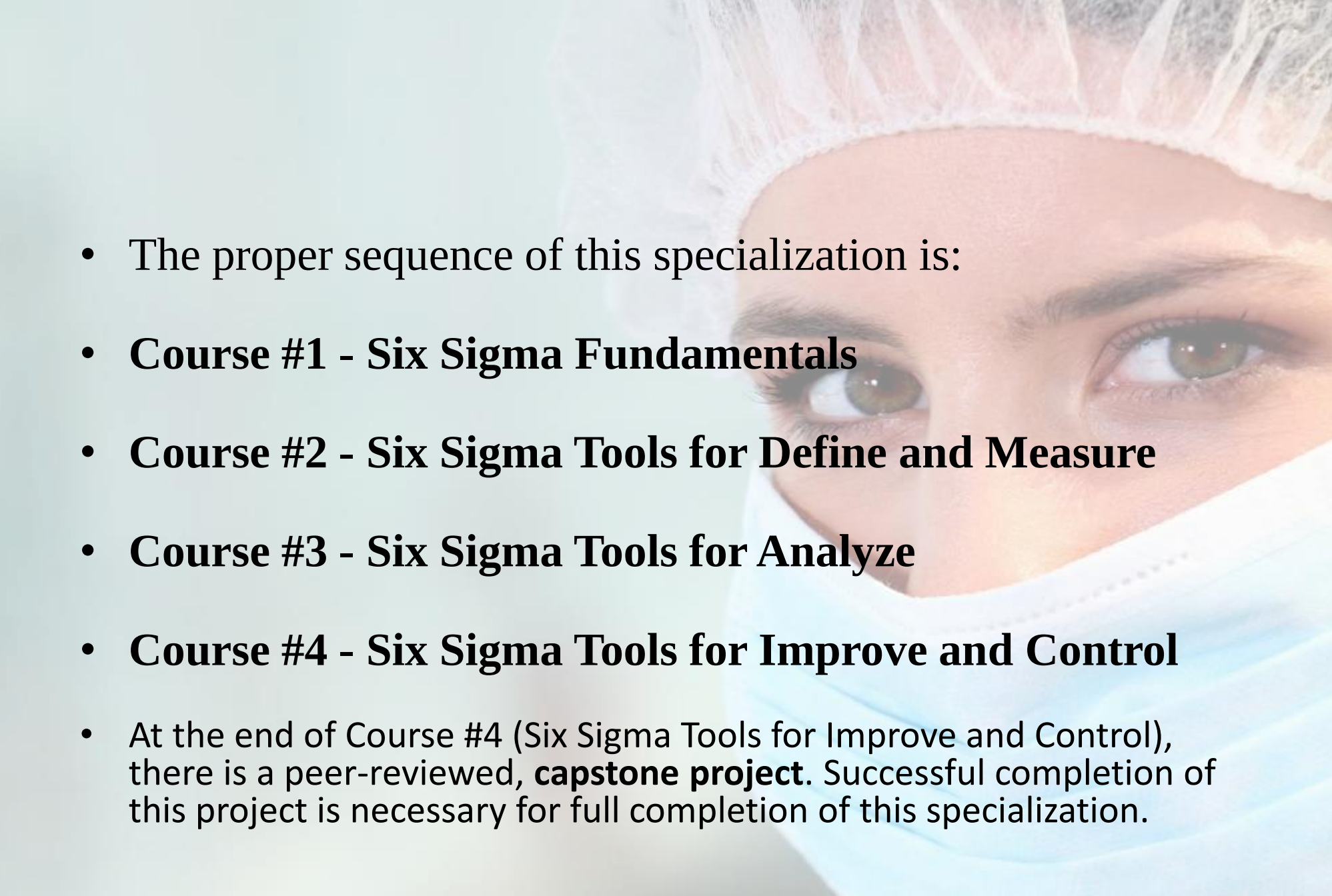
Lean Six Sigma Yellow Belt Specialization

Introduction

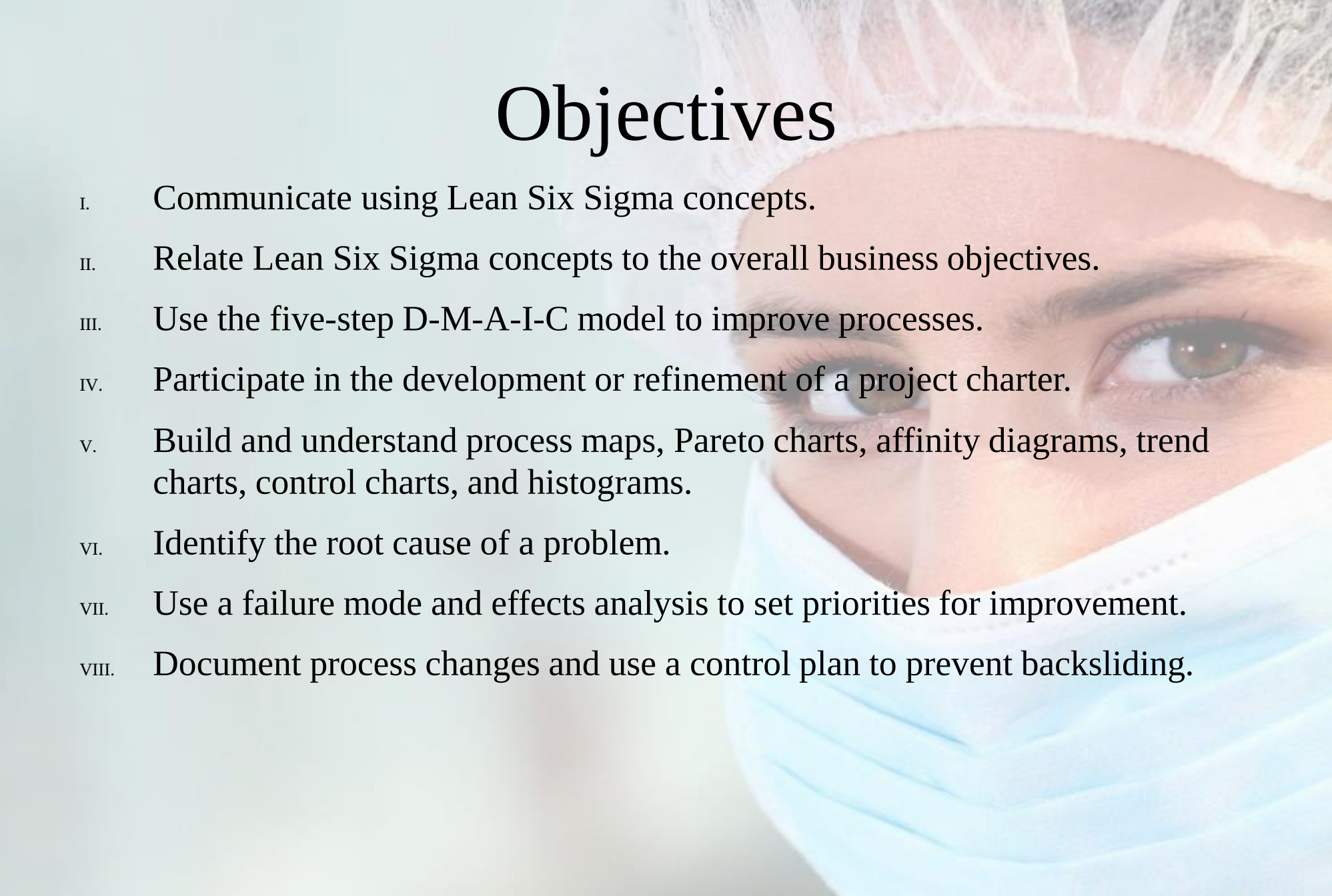
This Six Sigma Yellow Belt Specialization is to learn more about the basic components of Six Sigma and Lean. Six Sigma skills are widely sought by employers both nationally and internationally. These skills have been proven to help improve business processes, performance, and quality assurance. This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

- 
- 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

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

COURSE 1

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.

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.

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.

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.

Content of course 1

Week 1	Week 2	Week 3	Week 4
• What is Quality - Origins of Six Sigma - • 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	• Introduction to Quality Tools • Pareto Charts • Cause and Effect Diagrams • Flow Charts and Process Mapping • Checksheets • Scatter Diagrams • Histograms • Six Sigma Measure • Cost of Poor Quality	• Importance of Teams • Types of Teams • Stages of Team Development • Brainstorming • Team Decision-Making • Agendas, Minutes, and Status Reports	• Purpose of Lean • Value Stream Mapping • Interview: Real World Value Stream Mapping • JIT & KanBan • Poka Yoke • Value to the Organization

COURSE 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.

Week 2: Project Management Basics

This module is about 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.

Week 3: Basic Statistics

The next phase of the DMAIC process is the Measure phase. We will begin by exploring basic statistics and its significance to Six Sigma. This module will introduce 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

Week 4: Data Collection

The second aspect of the Measure phase is Data Collection. In this module we will learn different techniques on how to collect data, the reasons for collecting data, and ensuring data accuracy and integrity.

Content of course 2

Week 1	Week 2	Week 3	Week 4
• Voice of the Customer • Critical to Satisfaction1m • Quality Function Deployment • Project Selection • SWOT Analysis • Identifying Stakeholders • Process Identification • SIPOC	• Defining the Problem Statement • Developing a Project Plan • Brainstorming & Diagramming Tools • Other Project Planning Tools • Six Sigma Phase Reviews	• Basic Statistics pt	• Data Collection • Data Collection Techniques

Course 3

Six Tool 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.

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.

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.

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.

Content of Course 3

WEEK 1	WEEK 2	WEEK 3	WEEK 4
• Measurement System Analysis • GR&R	• Process Analysis Tools • Eliminating Waste • 5S • FMEA	• Root Cause Analysis • 5 Whys • Process Mapping • Force Field Analysis • Matrix Charts	• Characteristics of Probability Distributions • Calculating Probabilities Using the Normal Distribution • The Binomial Distribution • Binomial Distribution Calculations • Common Versus Special Cause Variation

Course 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.

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.

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).

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.

Content of Course 4

Week 1	Week 2	Week 3	Week 4
• Dependent and Independent Variables • Types of Correlation • The Regression Equation • Use of Regression for Prediction • Regression for Six Sigma	• Hypothesis Testing Basics • Types of Errors • How To Do A Hypothesis Test • P-value and Statistical Significance	• Introduction • Suboptimization • Kaizen and Kaizen Blitz • PDCA • Cost Benefit Analysis • Cost of Quality	• Control Charts • Document Management

- Week 5: (application of DMAIC model)

It was dedicated to capstone project, in which you have to develop a virtual situation, in which you need to identify the problem area and then analyze it. Find the root cause and look for possible solutions. Improve the system accordingly and make the required changes in the system for control.

Learning Methodology

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

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.

Continue...

- 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**



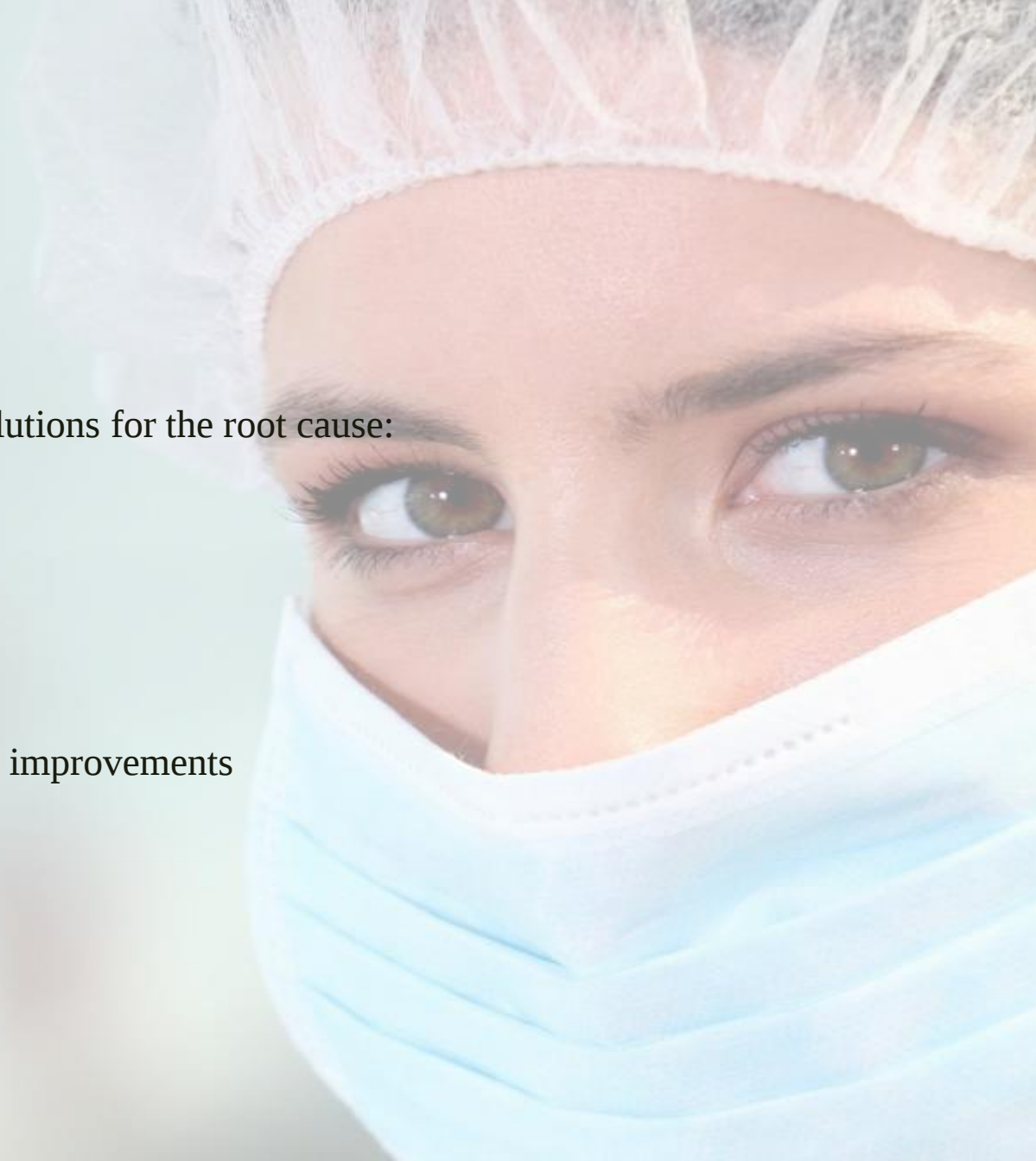
STEP 4: IMPROVE PHASE

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.





4 Courses

Six Sigma Principles

Six Sigma Tools for Define and Measure

Six Sigma Tools for Analyze

Six Sigma Tools for Improve and Control



05/27/2020

Sonal Jain

has successfully completed the online, non-credit Specialization

Six Sigma Yellow Belt

This specialization is for you if you are looking to learn more about Six Sigma or refresh your knowledge of 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. In this specialization, you will learn proven principles and tools specific to six sigma and lean.

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THANK YOU

