**University of Bahrain**

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| **College of Science** | **Department of Mathematics** |



**Assessing Bahrain Hospital Bed Capacity during the COVID-19 Pandemic**

This report is submitted in partial fulfilment of the requirements for the Research Methods course in pursuit of a master’s degree in Big Data Science and Analytics

**Prepared by**

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University of Bahrain

**Kingdom of Bahrain**

**December 2020**

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Abstract

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Chapter One

Introduction to the Study

‎‎1.1 Introduction

‎1.2 Research Problem

‎1.3 Research Questions

‎1.4 Research Objectives

‎1.5 Research Significance

‎1.6 Research Setting

‎1.7 Definition of Terms

Chapter One

Introduction to the Study

Introduction

This section introduces the research and report.

Research Problem

This section describes the research problem addressed by this research.

Research Questions

This section describes the questions that this research aimed to answer.

Research Objectives

This section describes the objectives that this research aimed to achieve.

Research Significance

This section describes the importance of this research.

Research Setting

This section describes the context of how this research was conducted, including scope.

Definition of Terms

This section lists all the terms and their abbreviations used within the report.

Chapter Two

Theoretical Framework and Literature Review

‎‎1.1 Introduction

‎2.1 Literature Review

‎2.2 Theoretical Framework

‎2.3 Research Hypothesis

Chapter Two

Theoretical Framework and Literature Review

Literature Review

This section goes through similar research topics conducted and compares between previous relevant works related to this research.

Theoretical Framework

This section describes the how this research will be implemented and carried out.

Research Hypothesis

This section defines and describes the hypothesis assumed by the researchers.

Chapter Three

Methods and Procedures

‎3.1 Research Study’s Methodology

‎3.2 Research Study’s Population and Sample

‎3.3 Research Study’s Tools

‎3.4 Data Collection and Procedures

‎3.5 Statistical Approaches

Chapter Three

Methods and Procedures

Methodology

In this research, we have adopted an exploratory scenario-based research design in which we will assess the capability of the Kingdom of Bahrain to respond to the sudden increase of COVID-19 cases that will require hospitalization. Based on the current rate of infections (for COVID-19), we will use a statistical growth method to project the increase in the number of cases for a pre-defined period of three months. Thus, with the projected number of hospitalized cases and based on the current capacity of the health system, we will assess the health system’s ability to respond to the increase of infections and avoid reaching saturation (i.e., over-exceeded).

The below figure, **Fig. 1**, illustrates the scenario design template that we developed for this research, highlighting the variables that can be altered across different scenarios.

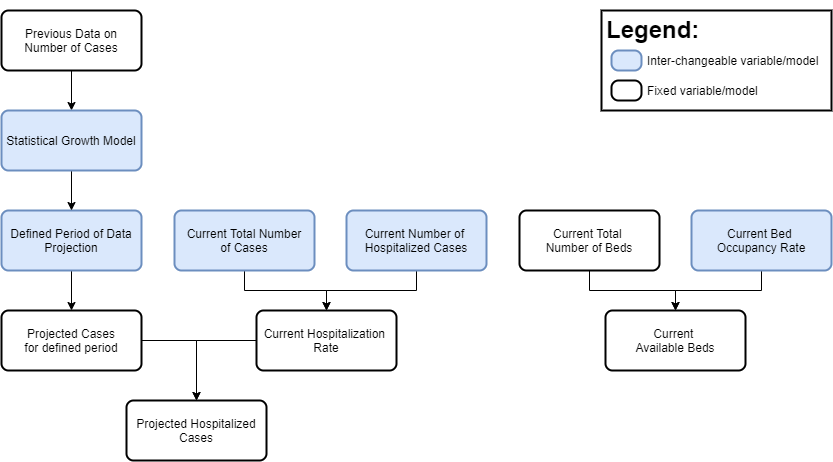


Fig. 1: Scenario Design Template

The table below, Table (1), illustrate the assumptions and definitions that we will use to define the context of our scenario (based on the scenario design template).

Table (1): Adopted Scenario Variables

|  |  |
| --- | --- |
| **Variable** | **Implementation in our scenario** |
| Statistical Growth Model | For the statistical growth model, we will the Logistic Growth Model to project the number of cases in our scenario. A different model would project a different number and hence change the scenario. |
| Defined Period of Data Projection | For the defined period of data projection, we will project data for three months (90 days) and hence our scenario is limited to this timeframe. |
| Current Total Number of Cases | In our scenario, we will use the total number of cases and hospitalized cases as published by the Ministry of Health (2020) on the 1st of August 2020. These values play an important role as they determine the hospitalization rate for our scenario. |
| Current Number of Hospitalized Cases |
| Current Bed Occupancy Rate (BOR) | The current hospital BOR was assumed at 80% as per conversation with a health worker in the Kingdom of Bahrain (Hilal, 2020) and the FICU BOR was obtained from publicly reported figures by Naar (2020). |

Population

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Research Study’s Tools

How we extracted the data

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Data Collection and Procedures

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Text comes here

Statistical Approaches

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Chapter Four

Results, Discussion, Conclusion and Recommendations

‎4.1 Results

‎4.2 Discussion

‎4.3 Conclusion

‎4.4 Recommendations and Limitations

Chapter Four

Results, Discussion, Conclusion and Recommendations

Results

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Discussion

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Text comes here

Text comes here

Conclusion

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Text comes here

Text comes here

Recommendations and Limitations

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Limitations

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References

Hilal, D. S. (2020). *Conversation with Dr. Sawsan Hilal*.

Ministry of Health. (2020). *Coronavirus COVID-19 - Summary of Cases*. https://www.moh.gov.bh/?lang=en

Naar, I. (2020). *Coronavirus: Bahrain expands bed capacity at its isolation, quarantine centers*. Al Arabiya English. https://english.alarabiya.net/en/coronavirus/2020/05/13/Coronavirus-Bahrain-expands-bed-capacity-at-its-isolation-quarantine-centers