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**BINDURA UNIVERSITY OF SCIENCE EDUCATION**

**FACULTY OF COMMERCE**

**DEPARTMENT OF ECONOMICS**

**RESEARCH PROJECT**

**THE IMPACT OF COVID 19 ON THE MEDICINAL SUPPLY CHAIN: CASE OF BINDURA PROVINCIAL HOSPITAL.**

**BY**

**BIANCA KANYERE**

**B190005A**

**SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE BACHELOR OF COMMERCE DEGREE IN PURCHASING AND SUPPLY**

**BINDURA, ZIMBABWE 2022**

**APROVAL FORM**

**The undersigned certify that they have read and recommended to Bindura University of Science Education (BUSE) for acceptance the dissertation with the title; “The effect of covid 19 on the medicinal supply chain: case of Bindura Provincial Hospital” by B190005A in partial fulfilment of the requirements for Bachelor of Commerce Degree in Purchasing and Supply.**

**B1440903 …………………….. ………………….**

**Student’s name Signature Date**

**Supervisor ………………………. …………………..**

**Mr Nkala Signature Date**

**Faculty Chairperson …………………….. ………………….**

**Signature Date**

**RELEASE FORM**

**Name of author: B190005A**

**Title of dissertation: The impact of covid 19 on the medicinal supply chain: case of Bindura Provincial Hospital housing Degree to which dissertation was presented: Bachelor of Commerce Degree in Purchasing and Supply**

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**Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Permanent Address: 113 Hay Road**

**Bindura**

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This research project is my original work and has not been presented to any other university

B190005A

………...…………. ………………………..

Signature Date

Supervisor

This research project has been submitted for examination with my approval as the BUSE Supervisor

Mr Nkala

…………………………… ………………………………

Signature Date

# DEDICATION

This project is dedicated to my parents and my supervisor Mr Nkala who made it possible for me to reach this level of education through their prayers, faith, encouragements and commitment towards my studies.

# ACKNOWLEDGEMENT

I would like to express my heartfelt appreciation to the Almighty God for His protection and guidance without which l would not have come this far. Profound gratitude goes to my supervisor, for the expert advice, unwavering support, guidance and inspiration.

My sincere gratitude goes to my respondents for their cooperation and hard work for this piece of work to materialise.

# ABSTRACT

The study sought to assess the impacts of COVID-19 on the supply chain of medicinal supply as a case study of Bindura Provincial Hospital in Bindura, Zimbabwe. This was achieved identifying the effects of covid 19 on medicinal supply chain activities at Bindura provincial hospital and evaluating the strategies put in place by the hospital in curbing the impacts of the shock from the COVID-19 pandemic on supply chain management. The study further proposed possible intervention measures that could be adopted to support sustainable supply chain management during possible health shock in future.

To achieve these research objectives, data was gathered using a mixed method for both quantitative and qualitative data from a sample size of 60 respondents. The study targeted responses from doctors, nurses, hospital management, medical superintend, patients and stores clerk. The data was collected with response rate of 86.7% from a distribution of 52 out of 60 questionnaires administered and 5 interviews were successful. Through the use the descriptive statistics focusing on the mean score and standard deviations produced by Statistical Package for Social Sciences (SPSS) application data was presented, analysed and discussed accordingly leading to the conclusions and recommendations.

The Cronbach’s Alpha was used to check and validate the content or variables of the research questionnaire checking the internal consistency of the instrument and the result was 0.718 which is greater than 0.70% hence it signified that the reliability was acceptable. From the findings major, the majority were male participants, the most affected departments were clinical and surgery followed by pharmacy. The first two effects recorded were, distortions to typical demand due to changes in customer purchasing behaviour and total revenue losses from cancelled surgeries and other Services. Also, the first two strategies observed were, utilization of technological solution through employing a range of digital and analytics solutions and building redundancy in the supply chain to increase supply chain resiliency.

The study also concluded by testing hypothesis using the Chi-square testing between the affirmation that COVID-19 against the effects COVID-19 to medicinal supply chain and the results which showed that there the alpha was 0 (.0%) and there are no cells that have expected frequencies less than 5, which conferred the assumption has not been violated and the study assumption **(H0)** has been accepted which concludes that there is a positive relationship between the variables hence COVID-19 has resulted in the adverse effects to the Hospital.

Lastly, proposed intervention measure was Revision of regulatory and reimbursement practices to promote the cost-efficient maintenance of inventories at multiple points in the supply chain. The study also recommended There should be zero import duties for pharmaceuticals and medical supplies and equipment encourages the hospitals to effectively acquire the shortages and to increase their supplies.

*Keywords; COVID-19, Supply chain, Medicinal, Supply Chain Management, Impacts, public health*

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# LIST OF ACCRONYMS AND ABBREVIATIONS

|  |  |  |
| --- | --- | --- |
| numbers | abbreviation | meaning |
| 1 | ICU | Intensive Care Unit |
| 2 | COVID | Coronavirus disease |
| 3 | ASHP | American Society of Health System Pharmacists |
| 4 | FAD | Feasible Arrival Date |
| 5 | PPE | Personal Protective Equipment |
| 6 | SPSS | Statistical Package for Social Sciences |
| 7 | WHO | World Health Organisation |
| 8 | ECDC | European Centre for Disease Prevention and Control. |

# CHAPTER ONE

# INTRODUCTION TO THE STUDY

## 1.1 INTRODUCTION

The COVID-19 pandemic has disrupted medicine supply mostly in developing countries Barlas D, (2001). The study strongly believe covid 19 has affected the supply chain operations in the public health sector. Therefore, to test his assertion the study used the case of Bindura Provincial Hospital. The covid 19 phenomenon is an extraordinary hap that has encapsulated every nation, business, and supply chain on our planet. The pandemic left the health care systems in a mess, hospitals on the threshold of slump with their capacity flooded, critical item supply chains disturbed, and federal and state agencies struggling to take proactive and preventative measures. While governments and private sector organizations did have crises plans and stockpiles in place, the pandemic exposed many vital supply chain vulnerabilities, including lack of Personal Protective Equipment (PPE) and testing kits (European Center for Disease Prevention) ([2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0005)), which has become a cause of concern in the country Zimbabwe using a case study of Bindura Provincial Hospital (BPH).

According to Barlas (2001), supply chain is defined as the network of all the individuals, organisations, resources, activities and technology involved in the creation and sale of a product. In hospitals, supply chain refers to all the processes involved in making sure that health systems clinical staff have the medications, medical supplies, and non-medical supplies they need to care for patience. Availability of supplies and PPE in health facilities, may health facilities lack consumables including medicines and sundries. Some of these are imported, or the local industries stopped production temporarily due to lockdown where movements of people or goods and services where restricted from moving (ECDC, [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0005)).

In response to the pandemic, organizations across different industry division have attempted to sustain their supply chains by conducting risk assessments and executing business continuity plans. Many have modified their product portfolio to respond to changing demands, making new products established on their existing resources. For example, some apparel manufacturers began producing PPE, and some manufacturers started making hand sanitizer.

To nourish and sustain the health care supply chain for the future, it is important to first discover the challenges that arise in the vital supply chain disturbances seen throughout the pandemic. Next, health care organizations and pharmaceutical companies need to evaluate which strategies can help them reduce supply chain disturbances during major emergencies without incurring excessive costs (Browing J, [2000](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0024)). For example, while holding large amounts of safety stocks for a broad variety of health care items production of a wide array of items would improve enhance resiliency, they would be very costly strategies, and therefore not practical. Finally, solutions cannot just come from the private sector. Emergency preparedness is a public health critical, and federal, state, and local governments need to evaluate what policy recommendation they should perform in the wake of this experience as ably.

## 1.2 BACKGROUND OF THE STUDY

In December 2019, the novel coronavirus was detected in the city of Wuhan, China. The disease was termed Coronavirus Disease 2019 (COVID-19) (Yao *et al.,* [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0024)). By 15 February 2020, COVID-19 had rapidly spread throughout China and across the world, until it was declared a pandemic in March 2020 by the World Health Organization (Wu and Yang, [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0023)). According to the European Centre for Disease Prevention and Control (ECDC, [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0005)), ‘As of 24 April 2020, the COVID-19 outbreak had caused over 2 668,000 cases worldwide since the first case was reported in China in January 2020’.

Zimbabwe confirmed its first COVID-19 case in March 2020. Since then, the number has been increasing, and is now approximating 4000. A national lockdown was introduced on 30 March 2020. Apart from limiting human movements, the restrictions resulted in stoppage of non-emergency medical care at health institutions, and disruptions in supply chains of consumables for medical care. These disruptions could have devastating consequences on healthcare delivery for the population. Due to weak surveillance systems in Zimbabwe, the accurate indirect effects of the COVID-19 maybe difficult to assess.

However, experience from previous crises such as the Ebola viral disease outbreak show that the indirect impacts of such disasters can be far reaching. Preliminary data are revealing preventable losses of life that can be attributed indirectly to the COVID-19 pandemic. A comparative audit of maternal and perinatal outcomes at two hospitals in Harare suggested reduced utilisation of health services, and a trend towards a rise in maternal and perinatal mortality. I review the implications of lockdowns on healthcare delivery and offer mitigating action-oriented public health interventions to limit further damages it also affects the supply chain if medicals equipment. As there is no vaccine or treatment identified, the disease is likely to sweep the nations if uncontrolled. The virus is reported to thrive well in poor hygienic conditions and weak health systems. The pandemic has provoked serious social and supply chain disruption globally, including strict social distancing, travel restrictions, and one of the largest global recessions since the Great Depression ([Cohen,E](https://www.frontiersin.org/articles/10.3389/frsus.2021.631182/full" \l "B54) & Schmidt,w. 1999).

As with most countries, the demand for services was higher in public hospitals than in private hospitals which had the testing equipment (Evans, B 2003), however the testing equipment were also becoming scarce in public hospitals such as Bindura Provincial Hospital. Countries with strong health systems like United States and United Kingdom were also experiencing challenges with COVID-19. United States is the worst-affected country with surging infections and deaths (Grant *et al.,* [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0008)). Iran's hospitals struggled to cope while in Spain, the private hospitals had to be nationalized to cope with the pandemic (Evans, B. 2003).

The countries that are mostly threatened by the pandemic have been reported to be low- and middle-income countries inclusive of Zimbabwe. This is mainly due to failings regards to their health systems. One of the problems that affected nearly all countries in the world during COVID-19 pandemic was ability to provide adequate and appropriate personal protective equipment (PPE) (Saunders,M 1997). The shortage of PPE is worse in LMICs resulting in fast spread of COVID-19.

In the process of arresting COVID-19, social distancing is regarded as a key response to the pandemic (Grant et al,[2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0013)). Social distancing involves creating a space between people to prevent infection of a pandemic. Social distancing is a challenge to many communities in LMICs due to scarcity of resources and living styles, for example, congested economic activities at places like markets or fetching water from one source (Sigh and Adhikari, [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0021)). Covid-19 is spread through respiratory droplets passed from one person to another through sneezing, coughing and when people interact with each other in close proximity (ECDC, 2020).

Public operations at hospitals such as Bindura Provincial Hospital are trying to adapt to the new situation and will probably face changes that will remain even after the pandemic might be over. In the news, supply chains in relation to the pandemic are widely discussed, and scientific research on the implications of the crisis has already started ([Lopes de Sousa Jabbour *et al.*, 2020](https://www.frontiersin.org/articles/10.3389/frsus.2021.631182/full#B29); [Queiroz *et al.*, 2020](https://www.frontiersin.org/articles/10.3389/frsus.2021.631182/full#B42); [Schmidt, 2020](https://www.frontiersin.org/articles/10.3389/frsus.2021.631182/full#B45)). However, traditional research paradigms fail to keep up with the pace of the current epidemic and economic developments, and thus there is still little empirical evidence on how the coronavirus pandemic impacts supply chain. This seems evident addressing risk and resilience-related supply chain constructs that quickly moved into the center of attention, which seems somewhat straightforward ([Queiroz et al., 2020](https://www.frontiersin.org/articles/10.3389/frsus.2021.631182/full#B42)). The induced rethinking of supply chain management might offer an opportunity for improved resilience, risk mitigation of medicinal supply. Therefore, it is key to analyze the impact of covid 19 pandemic in the medicinal supply chain especially with focus of public health service delivery.

## 1.3 STATEMENT OF THE PROBLEM

Covid-19 has a negative impact on Zimbabwe’s grassroot level activities such as movement obstruction of employees working in public health sector who commute to and from work, due to untimely cooperation between different transporters and couriers. All these factors caused delays and crippled the logistics and supply chain affecting transportation of vaccines, health workers, medical equipment and raw materials.

Supply chain disruption which was caused by Covid 19 created shortage of health workforce thus that has reduced production capacity in health delivery services, distortions to typical demand due to changes in customer purchasing behaviour, and the fact that manufacturing and logistics systems ([Queiroz *et al.*, 2020](https://www.frontiersin.org/articles/10.3389/frsus.2021.631182/full#B42)). PPE equipment become scarce which led to spread of the Covid 19 resulting in death of patients as there becomes short supply. Therefore, this research seeks to explore the impacts of Covid 19 on supply chain in the health sector in Zimbabwe using the case of Bindura Provincial Hospital.

## 1.4 OBJECTIVES

### 1.4.1 General Objective

To assess the impacts of COVID-19 on the supply chain of medicinal supply at the Bindura Provincial Hospital, in Zimbabwe.

### 1.4.2 Specific Objectives

* To identify the effects of covid 19 on medicinal supply chain activities at Bindura provincial hospital.
* To evaluate the strategies put in place by the hospital in curbing the impacts of the shock from the COVID-19 pandemic on supply chain management.
* To propose possible intervention measures that could be adopted to support sustainable supply chain management during possible health shock in future.

## 1.5 RESEARCH QUESTIONS

* What are the effects of covid 19 on the implementation of effective medicinal supply chain at Bindura Provincial Hospital?
* What are the strategies adopted by the hospital in managing the impacts of Covid 19 on supply chain management?
* What are the intervention measures that could help build sustainable supply chain management at public hospitals?

## 1.6 STATE OF HYPOTHESIS

The researcher acknowledged the following comprehensive hypothesis for the study:

**H0:** Covid-19 affects the supply chain management of medicinal.

**H1:** Covid-19 does not affect the supply chain management of medicinal.

## SIGNIFICANCE OF STUDY

The research findings shall be beneficial to the Government, Hospitals, University and the researcher.

The study will also broaden the researcher’s practical knowledge in the field of research and ability to apply theory to practice such as in case of using interview skills and reporting skills.

## ASSUMPTIONS

* It is assumed that there are several factors that are affecting the supply chain of medicinal at Bindura Provincial Hospital.
* It is assumed that the sample taken will be a true representative of the population under study.
* It is assumed that the response rate is going to be so significant that the researcher would obtain complete, accurate and relevant data and thus draw valuable conclusions (ECDC, [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0005)).

## 1.9 DELIMITATIONS IF STUDY

The research study was confined to Supply Chain Management (SCM) and the Public Health Sector. The private sector and service wide Ministries will not be considered due to time constraints. Although there are many issues on supply chain management, this study only focused on the impacts of Covid 19 on SCM. In addition, the research in terms of time only covered the period 2019 up until now where covid 19 was at peak. The study used the case of hospitals for convenience purposes as data was easy to obtain from public health domain.

## 1.10 LIMITATIONS

This dissertation was constrained by financial, time and information accessibility restrictions:

The study was conducted with insufficient funding, with a limited budget. Because of this, site visits, phone calls and mailings were minimal, and as such follow-ups may not have covered all best possible data collection points. However, in an attempt to cut some of the transportation costs, stationery, printing costs and other expenses, the researcher sought refuge in the use of Internet based communications.

The economist was inhibited by the time allotted for the study. Time was too short to focus in depth all elements of the research project. The researcher also had to pay attention to other academic requests while working on a research project. The collection of data from respondents depends on the time frame. The researcher, however, managed to do some of the research during the vacation before the first semester.

The information required was confidential and sensitive to the organizations being studied because it was part of their weakness or strength (strategic aspects). Therefore, some were reluctant to disclose such information, and so the researcher ensured respondents that their information would be treated with the utmost confidentiality and discretion. The availability of information was also affected by delays in responses and complete refusal to respond to questionnaires. To avoid the delays in responses prevalent in the email survey, the researcher sent reminder letters as follow-up or used personal administration for some respondents. In addition, the researcher followed some questionnaires on the phone.

## 1.11 DEFINITION OF TERMS

**Supply chain management** is defined as bringing together critical business processes from the end user through initial suppliers that offer goods, services and information that add value to customers and other stakeholders (Sigh and Adhikan, 2020).

**Supply chain** (SC) refers to the total system that consists of organizations, equipment, processes, activities, and people who produces goods from raw materials and delivers them to the end customer (Schorr,J. 1998).

**Procurement** is the business management function that ensures identification, sourcing, access and management of the external resources that an organisation needs or may need to fulfil its strategic objectives. (Charted Institute of Purchasing and Supply 2005).

**1.12 CHAPTER SUMMARY**

The chapter explains the critical sections, emphasizes the background of the study, the research problem, the research objectives relevant to the research questions, and indicates the relevance of the study to the various hospitals. In addition, it also highlighted the limitations of the study, and the limitations that arose in the course of the study. The next Chapter will give a far-reaching overview of the subject.

# CHAPTER TWO:

# LITERATURE REVIEW

## 2.1 INTRODUCTION

This chapter provides an interrogation of previous scholarly research’s pertinent to this study. The review literature is to identify gaps and provide a critical review by analysing literature on the impacts of covid 19 in the Supply Chain Management of medicines in public health sectors. The chapter also detailed key theories fundamental to the study and reviewed empirical evidence provided from a regional and global perspective through the funnel approach. The researcher used the research objectives to structure this chapter accordingly.

## 2.2 THEORETICAL FRAMEWORK OR CONCEPTUAL FRAMEWORK

In December 2019, the novel coronavirus was detected in the city of Wuhan, China. The disease was termed Coronavirus Disease 2019 (COVID-19) (Yao *et al*., [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0024)). By 15 February 2020, COVID-19 had rapidly spread throughout China and across the world, until it was declared a pandemic in March 2020 by the World Health Organization (Wu and Yang, [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0023)).

However, experience from previous crises such as the Ebola viral disease outbreak show that the indirect impacts of such disasters can be far reaching. Preliminary data are revealing preventable losses of life that can be attributed indirectly to the COVID-19 pandemic. A comparative audit of maternal and perinatal outcomes at two hospitals in Harare suggested reduced utilisation of health services, and a rising trend towards in maternal and perinatal mortality. The study reviewed the implications of lockdowns on healthcare delivery and offers mitigating action-oriented public health interventions to limit further damages. The Covid-19 is reported to thrive well in poor hygienic conditions and weak health systems. The pandemic has provoked serious social and supply chain disruption globally, including strict social distancing, travel restrictions, and one of the largest global recessions since the Great Depression ([Kissler, 2020](https://www.frontiersin.org/articles/10.3389/frsus.2021.631182/full#B54)).

As with most countries, the demand for services was higher in public hospitals than in private hospitals which had the testing equipment (Evans, B.2003.), however the testing equipment were also becoming scarce in public hospitals such as Bindura Provincial Hospital. Countries with strong health systems like United States and United Kingdom were also experiencing challenges with COVID-19. United States is the worst-affected country with surging infections and deaths (Grant *et al.,* [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0008)). Iran's hospitals struggled to cope while in Spain, the private hospitals had to be nationalized to cope with the pandemic Sigh and Adhikan. [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0017)).

The countries that are mostly threatened by the pandemic have been reported to be low- and middle-income countries inclusive of Zimbabwe. This is mainly due to failings of their health systems. One of the problems that affected nearly all countries in the world during COVID-19 pandemic was ability to provide adequate and appropriate personal protective equipment (PPE) (Grant et al,2020.). The shortage of PPE is worse in LMICs resulting in fast spread of COVID-19.

In the process of arresting COVID-19, social distancing is regarded as a key response to the pandemic (Kissler, [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0013)). Social distancing involves creating a space between people to prevent infection of a pandemic. Social distancing is a challenge to many communities in LMICs due to scarcity of resources and living styles, for example, congested economic activities at places like markets or fetching water from one source (Sigh and Adhikari, [2020](https://onlinelibrary.wiley.com/doi/full/10.1111/hsc.13742#hsc13742-bib-0021)). Covid-19 is spread through respiratory droplets passed from one person to another through sneezing, coughing and when people interact with each other in close proximity (ECDC, 2020).

The contemplations around the theories for which this global pandemic is believed to be has adverse impacts to the supply chain operations and that has affected the health sector of the country.

## 2.3 BACKGROUND OF COVID-19 IN ZIMBABWE

Zimbabwe confirmed its first COVID-19 case in March 2020. Since then, the number has been increasing, and at December 2021 the cases were approximating 4000 (Makoni, 2021). The lockdown for the whole nation was introduced on 30 March 2020. Apart from limiting human movements, the restrictions resulted in stoppage of non-emergency medical care at health institutions, and disruptions in supply chains of consumables for medical care according to Bikwa and Kuwandoga, (2020). These disruptions have devastating consequences on healthcare delivery for the population. It was difficult to assess the accurate indirect effects of the COVID-19 due to weak surveillance systems in Zimbabwe. Preliminary data are revealing preventable losses of life that can be attributed indirectly to the COVID-19 pandemic according to (WHO 2020).

Public operations at hospitals such as Bindura Provincial Hospital had been trying to adapt to the new situation and will probably face changes in our procurement is done that will remain even after the pandemic might be over. In the news, supply chains in relation to the pandemic are widely discussed, and scientific research on the implications of the crisis has already started ([Lopes de Sousa Jabbour et al., 2020](https://www.frontiersin.org/articles/10.3389/frsus.2021.631182/full#B29); [Queiroz et al., 2020](https://www.frontiersin.org/articles/10.3389/frsus.2021.631182/full#B42); [Schmidt, 2020](https://www.frontiersin.org/articles/10.3389/frsus.2021.631182/full#B45)). However, traditional research paradigms fail to keep up with the pace of the current epidemic and economic developments, and thus there is still little empirical evidence on how the coronavirus pandemic impacts supply chain.

This seems evident addressing risk and resilience-related supply chain constructs that quickly moved into the center of attention, which seems somewhat straightforward ([Queiroz et al., 2020](https://www.frontiersin.org/articles/10.3389/frsus.2021.631182/full#B42)). The induced rethinking of supply chain management might offer an opportunity for improved resilience, risk mitigation of medicinal supply. Therefore, it is key to analyze the impact of covid 19 pandemic in the medicinal supply chain especially with focus of public health service delivery.

A comparative audit of maternal and perinatal outcomes at two hospitals in Harare suggested reduced utilization of health services, and a trend towards a rise in maternal and perinatal mortality. We review the implications of lockdowns on healthcare delivery and offer mitigating action-oriented public health interventions to limit further damage (Evan, B. 2003.)

## 2.4 SUPPLY CHAIN MANAGEMENT

Sigh and Adhikari (2020) refers Supply Chain management as the management of flow of products and services, which begins from the origin of products and ends with the product’s consumption at the end-user. Christopher M (1998) assert that the main objective of supply chain management is to monitor and relate production, distribution, and shipment of products and services. This can be done by companies with a very good and tight hold over internal inventories, production, distribution, internal productions and sales.

The Supply Chain Event Management considers the factors that may interrupt the flow of an effective supply chain; possible scenarios are considered and accordingly, solutions are devised for them case of covid 19 which interrupted the supply chain of medicinal in hospitals (Barlas D (2021). Supply chain management should be done according to the demand and supply view. In order to understand customers’ demands, market research should be done. The second thing to consider is awareness and updated information about the competitors and strategies used by them to satisfy their customer demands and requirements. As we know, different markets have different demands and should be dealt with a different strategy.

Supply chain performance measure can be defined as an approach to judge the performance of supply chain system. Supply chain performance measures can broadly be classified into two categories: Qualitative measures, for example, customer satisfaction and product quality. Quantitative measures for example, order-to-delivery lead time, supply chain response time, flexibility, resource utilization, delivery performance.

## 2.5 EFFECTS OF COVID 19 ON MEDICINAL SUPPLY CHAIN

As the COVID-19 pandemic continues to spread, it has exposed vulnerabilities of supply chains and logistics. It has disrupted health supply chains, affecting active pharmaceutical ingredients, shipping, procurements, finished healthcare products and more (European Pharmaceutical Review, 2020). Logistics supply chain means much more than the movement of pharmaceuticals and other products between countries. It definitely deals with problems at the grassroots level, including the migration of labourers working in industrial units, ban on transportation activities, especially trucks, lack of cooperation between different administrations and transporters and couriers not functioning timely.

Public transporters, except for those affiliated to a national passenger company are banned. During the covid 19 pandemic medicinal supplies were able to be transported hence not all medicines and surgical where approved to move from one country to another. Several checkpoints are in place to control movements. Bad roads, shortage of fuel and poor digital networks compound the delays.

All these factors cause delays and hamper the supply chain, causing issues in supplies of vaccines, hand sanitisers, testing kits, protective healthcare equipment (PPE), medicines, medical equipment, raw material and much more (The Economic Times, 2020). The slowdown in imports has also affected the innovative drug developers. The manufacturers of branded pharmaceuticals may see a shift in their demand, both as antiviral use rises, and as other chronic conditions are left untreated by patients due to concerns over exposure to the pandemic.

The study identified that COVID-19 resulted in the Drug Shortage Costs for which it was recorded that every year, hospitals expend financial resources to cope with ongoing drug shortages, with one estimate putting this cost at nearly $400 million per year. According to AHA, 2020, as a result of the pandemic, lower than normal drug supply due to fractured pharmaceutical supply chains has been met with increasing demand for certain drugs necessary to treat the surge of patients with COVID-19 infections. This situation has created a perfect storm for drug shortages for many vital drugs resulting in higher costs for hospitals. (American Hospital Association, 2020)

Also, due to the pandemic, Hospitals have experienced increased costs for non-PPE medical supplies and equipment. For example, many hospitals acquired ventilators in anticipation of a surge of COVID-19 patients. There are limited data available to understand the additional cost-burden hospitals face as they acquire non-PPE medical supplies and equipment in preparation for COVID-19 patients. (American Hospital Association, 2020)

On the same note, there was also additional costs associated with purchasing needed PPE. The AHA estimates the non-treatment costs for hospitals and health systems to be $2.4 billion over a period of four months, from March to June 2020, or roughly $600 million per month. Demand for equipment and supplies, such as PPE, has increased as a result of the COVID-19 pandemic. Hospitals have incurred additional costs as they struggle to acquire additional supplies to meet the needs of their patients and staff. Moreover, current guidelines require all hospital workers to wear some PPE, regardless of whether they are in direct contact with COVID-19 patients.

Due to COVID-19, there was a Total Revenue Losses from Cancelled Surgeries and Other Services. The AHA estimates that, as a result of cancelled hospital services due to the COVID-19 pandemic, U.S. nonfederal hospitals stand to lose approximately $161.4 billion in revenue over a period of four months, from March to June 2020. This includes cancelled surgeries, various levels of cancelled non-elective surgeries and outpatient treatment, and reduced emergency department services. (American Hospital Association, 2020)

Supply chain disruptions have led to shortage of consumables, including life-saving medicines. In some places, attention has been shifted to COVID-19 related care and emergency-preparedness capacity building. The impact of the delays on mortality and morbidity will have a skewed distribution.

People with comprehensive medical insurance schemes can access treatment services timeously in the private sector. Unfortunately, close to 90% of Zimbabweans have no medical insurance and will struggle to access even basic health services. Thus, people will die from preventable causes, especially in pregnancy. Zimbabwe´s maternal mortality is among the highest in Sub-Saharan Africa and the pandemic could be worse at the end Huston C (1993). When the pandemic was on hit other citizens could not get maximum attention due to the insufficient of medical equipment.

With the COVID-19 crisis, fundamental changes in consumer behavior, supply chains, and routes to market are knocking companies off balance. Responding to the pandemic has underscored the need for leaders to accelerate the adoption of agile ways of working and value chain transformation to help outmaneuver uncertainty.

COVID-19 is not a typical risk event. According to Steven M (2021) the scale of its impact eclipses anything most supply chain leaders will have seen before. The speed of the escalation requires continuous end-to-end assessment, optimization and monitoring. Companies need to respond rapidly and confidently to shape and execute a short-term tactical plan that will mitigate the risks to human health and protect the functioning of global supply chains. In doing so, strong data and analytics capabilities are crucial in understanding complexity, anticipating potential disruption, and quickly developing a response.

The research participants reported poor hygiene in hospitals due to the shortage of clinical supplies and medication. Many people coming into the clinic risk being infected with other diseases. The health facilities became a danger to patience and professionals as they could not prevent themselves from Covid 19 due to the shortages of surgical and other equipment to protect the employees.

Lockdown in Zimbabwe, a number of vaccination clinics were stopped, and some children possibly missed some doses, though services seem to be gradually normalising. Experience from previous outbreaks suggests that maternal, sexual and reproductive health services are easily neglected, resulting in reduced utilisation and undesirable maternal consequence. Reported shortages of hormonal contraceptives and condoms in health facilities and quarantine centres may result in upsurge of unintended pregnancies and sexually transmitted infections, including HIV. Unintended pregnancies can lead to unsafe terminations, fatal sepsis, hemorrhage and mortality. Couples may currently be spending more time together due to lock owns, with a resultant increase in the need for contraceptive. Therefor the supply of these contraceptive has been limited due to the covid 19 pandemic which is leading to unwanted pregnancies and drop out students

COVID-19 has disrupted supply chains around the world. But they have also been a vital lifeline to support the response, keeping essential medical supplies, food and other key necessities flowing where they’re needed most. There is no doubt that the pandemic has tested the ingenuity, resilience and flexibility of supply chain leaders globally, as they have sought to maintain essential operations.

## 2.6 STRATEGIES USED IN HOSPITALS SUPPLY CHAIN DURING COVID 19

The COVID-19 pandemic is an extraordinary event that has impacted every nation, business, and supply chain on our planet. The pandemic left the health care system in crisis: hospitals on the verge of collapse with their capacity overflowed, critical item supply chains interrupted, and federal and state agencies struggling to take palliative and preventative measures. While governments and private sector organizations did have disaster plans and stockpiles in place, the pandemic exposed several major supply chain vulnerabilities, including shortages of personal protective equipment (PPE) and testing kits hence several strategies were formulated to succumb the effects of COVID-19 to medicinal supply chain.

In response to the pandemic, organizations across many different industry segments have attempted to stabilize their supply chains by conducting risk assessments and implementing business continuity plans. Many have diversified their product portfolio to respond to changing demands, making new products based on their existing resources to match the current need with the resources they have so that they do not incur losses.

Build redundancy in the supply chain and change compensation programs accordingly. One way to increase supply chain resiliency is by adding redundancy in the supply chain, such as by carrying extra inventory of essential health care items, holding excess manufacturing capacity for producing critical items, or contracting with backup suppliers. (Grant et, al. 20200)

Utilize technology solutions. Employing a range of digital and analytics solutions can improve supply chain resiliency at a reasonable cost. For example, cloud-based supply platforms improve cross-entity collaboration by enhancing information sharing and helping companies avoid price gouging. (Grant et, al., 2020)

Create a holistic view of inventory through employing better cooperation, information sharing, and alignment among its members, health care supply chains could create a holistic view of essential medical supplies. Having such a view can ensure global optimization of the highly fragmented health care supply chains. Similarly, if both private and public organizations had a more centralized distribution system, they could more effectively align potential demands to constrained supply by avoiding excessing some regions and shortages in others. (Grant et, al., 2020)

Government Policies. The ideal public policy during a pandemic can be conceptualized as a coordinated effort among multiple actors in both the private and public sectors to minimize expected societal losses across two dimensions: health (cases, hospitalizations, and deaths) and socioeconomic activity (lower income and consumption, lower profits, and more limited social interactions). In general, stronger restrictions on social and economic activities lead to better expected health outcomes, so there exists a trade-off and an optimal set of policies that keep a proper balance between the two dimensions. Grant *et, al*., 2021)

In addition, an organized public platform in order to search for items provided by multiple suppliers and also establishing public organizations to monitor governmental policies and transactions may increase citizen confidence during the crisis. According to Christopher M (2019) policymakers establish warning systems to preemptively inform concerned parties of expected shortages, galvanize local manufacturers to begin production of drugs that may be in high demand and low in supply, creating a national stockpile for essential medications, and facilitate better means of communication among all stakeholders.

To aid in addressing this unprecedented situation, regulatory authorities, most notably the United States Food and Drug Administration (FDA) and American Society of Health-System Pharmacists (ASHP), have published a “drug shortage list” consisting of potential COVID-19 treatments and intensive care unit (ICU) medications for COVID-19 patients requiring mechanical ventilation. According Evans, B.2003) the FDA released a list of drugs in short supply, which included furosemide injections, dopamine, dobutamine, fentanyl, morphine, heparin, propofol, midazolam, and dexmedetomidine.

Full engagement of government, private parties, the local community and global village in fighting against COVID-19 since it was discovered that COVID-19 severely disrupted supply chains globally. Procurement leaders need to maintain business operations, fulfill urgent demands, and mitigate supplier challenges against a backdrop of significant disruption to their teams, people and local communities. Initial efforts have focused on managing upstream supply disruptions from tier 1 and tier 2 suppliers, while rebalancing short-term sourcing decisions in the light of supply network constraints (Barlas, D.2001). Now they need to turn their attention to the medium-term security of the supply base, unlocking funds intelligently and building future-proof resilience. This approach will not only help manage the immediate COVID-19 emergency, but also build stronger and more resilient businesses ready to thrive as economies return to growth.

## 2.7 INTERVENTION MEASURES THAT COULD BE ADOPTED TO SUPPORT SUSTAINABLE SUPPLY CHAIN MANAGEMENT

International community may benefit from the preparedness measures taken and opportunities missed mentioned, such as establishing an effective and reformed centralized procurement, developing and enforcing penalties to prevent price-gouging, mandating that data and dealings are maintained online and remain transparent, facilitating effective communication among all stakeholders, initiating and/or expanding local manufacturing practices, stockpiling essential drugs and equipment, and involving more pharmacists in the drug shortage mitigation processes.

* Enhanced supply by the government should provide increased relaxation on non-hotspot areas for opening up the industries. Easing restrictions on the movement of people and goods, logistics and allowing extended operating hours will further help improve the supply chain of businesses as well as sourcing of raw materials. The government should look at identifying key players in each sector value chain (raw materials suppliers, buyers, technology providers and logistics providers) and create an extensive database platform for each cluster in order to enable collaboration possibilities to improve the availability of raw materials in the country.
* There should be zero import duties for pharmaceuticals and medical supplies and equipment encourages the hospitals to effectively acquire the shortages and to increase their supplies.
* Through maintaining end-to-end public health supply chain visibility, that is critical to the Zimbabwean Government’s ability to anticipate, prepare for, and respond to potential disruptions, particularly during a public health emergency. The government should be prepared to implement new supply chain situational awareness capabilities and authorities as well as establish a rhythm of regular supply chain illumination, analysis, and mapping.
* Through expanding current supply chain visibility into critical public health and other all-hazard-scenario supplies requires 1) identifying and prioritizing the list of critical medical supplies/products for a pandemic response, and 2) prioritizing mapping and analysis of those products’ supply chains, to include raw materials, components, manufacturers, distributors, and end users.
* Sustainable supply chain can be achieved by making bold investments in the Zimbabwean public health industrial base:The country should sustain investments over the long term in a durable, resilient public health industry and workforce that are able to scale quickly and to ensure that PPE, diagnostics, and other medical countermeasures remain at the ready when we need them.
* Government public health supply chain talent by advancing workforce models that attract and retain talent in biopharmaceutical industry operations and practice; acquisitions and contracting staff; biotechnology development and deployment; and logistics, operations, and sustainment.
* Through revision of regulatory and reimbursement practices to promote the cost-efficient maintenance of inventories at multiple points in the supply chain.
* There should be a collaboration with trusted international partners, work to promote adoption and enforcement of ethical production and trade standards to mitigate risks caused by forced labor, counterfeits, and deficient product quality in the public health supply chain. Develop an integrated approach and communications mechanism for coordinating, tracking, and sharing public health supply chain information among federal departments and agencies.
* Reinforce supply chain agility to ensure that supply chain partners can better respond to supply chain disruptions and increased demand through promoting business models that support sustainability, flexibility, and resilience in the domestic industrial base and supply chain.
* Create good jobs through the public health supply chain and invest in skills development so that we have the talent needed to invent and make critical supplies by ensuring that skilled workers are available to work in the supply chain through investment in training and skills development.
* Establish standards, systems, and governance to manage the supply chain and ensure fair, equitable, and effective allocation of scarce resources.

## RESEARCH GAP

The study identified that the topic under investigation was never researched before in the Zimbabwean context and in the world at large since the pandemic was first of its kind and it came as a surprise. The research saw it viable and significant to investigate at Bindura Hospital if the effects, strategizes and intervention measures discovered in other countries are the same. The researcher also seeks to add more knowledge since there were very few publications that addressed the impacts of COVID-19 to the supply chain of medicinal in Zimbabwe.

## CHAPTER SUMMARY

The relevant issues discussed in this chapter included scholarly views. The literature indicates that, there is need to gather and conduct more research on supply chain management during in any pandemic such as covid 19 in order to fill the gap in the literature. The next chapter will focus its attention on the research methodologies used by the researcher to gather data on the on the extent of supply chain management strategies during such pandemics.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 INTRODUCTION

This chapter encompasses the research design and techniques used in exploring how Covid 19 affected supply chain management in Zimbabwe. This chapter discusses the research design, population and sample size, data collection techniques, research instrument, and data analysis.

## 3.2 RESEARCH APPROACH

Research approaches according to (Christopher, M. 1998.) refers to the plans and the procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation. This study will use a qualitative and quantitative research because of the nature of the research problem that was mentioned in the introductory chapter.

## 3.3 RESEARCH PHILOSOPHY

According to (Christopher, M. 1998), research philosophy is concerned with the views about how the world operates and, for academic purposes it focuses on reality, knowledge and existence. Philosophies enables individuals understand how they perceive the reality and how to gain knowledge. There are several research philosophies which include the following; qualitative and quantitative paradigms, Ontology, Epistemology and Methodology.

The best way to explain these philosophies is through the questions they seek to answer. Paradigms relates to the way of looking at the world, which is the perception itself. Ontology seeks to answer “what is real” question, epistemology seeks to answer “how can we know anything” and methodology seeks to answer “what methods should we use to conduct the research”. All the philosophies are interrelated and this research study adopted the qualitative and quantitative paradigms or the pragmatism (mixed method) approach.

## 3.4 RESEARCH DESIGN

Research design refers to the overall strategy utilised to carry out research that defines a succinct and logical plan to tackle established research question through the collection, interpretation, analysis and discussion of data ([Kissler, 2020](https://www.frontiersin.org/articles/10.3389/frsus.2021.631182/full#B54)).

Descriptive is used as an assessment tool to provide information on which to base sound decisions and to prepare the background for more constructive program of educational research. Furthermore, descriptive survey design allows observation of subjects in a completely natural and unchanged environment and yields rich data that leads to important recommendations. Descriptive surveys are designed to portray accurately the characteristics of particular individuals, situations or groups (Kissler, 2020.)

To get reliable statistical results, it’s important to survey people in fairly large numbers and to make sure they are a representative sample of total population. Descriptive research design allows the researcher to acquire information directly from the source and in a descriptive manner through questionnaire and interviews. The information gathered can be tabulated and depicted graphically to enhance strong analysis.

Longitudinal research design is method established to explore phenomena that have not before been researched or adequately explained. Longitudinal studies are a type of correlational research in which researchers observe and collect data on a number of variables without trying to influence those variables.

A descriptive and longitudinal research design was also chosen to meet the objectives of this study as it as is.

## 3.5 POPULATION, AND SAMPLING DETAILS

Yao et,al (2020) defines a population as a well-defined or set of people, services, elements, and events, group of things or households that are being investigated. Saunders *et al.,* (2005) further alludes that a population refers to the entire group of individuals or objects to which research is interested in generalizing the results of the study and having observable homogeneous characteristics. The population for this study was the Bindura Provincial Hospital key stakeholders including patients at Bindura Provincial Hospital in the city of Bindura. Out of the target population of 120 respondents, a sample was selected to participate in the research.

### 3.5.1 Sampling

**a) Sample size**

Meredith, J. R and Scott M, (2003) define a sample as a subset or some part of the population under investigation that will be analysed. The purpose of taking a sample is to obtain a result that is representative of the whole population without asking the whole population, according to Fisher (2010). It is important in any research to have an ideal sample size as an inadequate sample size may give inaccurate results and too large a sample may not be feasible to work with. As such, a sample of 60 respondents was used for this study. This sample size represented 50% of the target population. The sample constituted the executive and a few employees (Stores Clerk, Medical Superintend, Nurses, Doctors and management) selected randomly from the hospital to give opinions of effects of COVID-19 on supply chain management. The sample was chosen for the study because it gives advantages and capable of representing the population.

**b) Justification of sample size**

The researcher used a sample of 60, representing a half of the target population since (Barlas, D. 2001) posit that a valid sample size should constitute 30 or more % of the total population that is under study so as to enable the sample to provide a true picture of the total population based on personal judgement.

**c) Sampling technique**

There are two major types of sampling, that is, probability sampling and non-probability sampling method. The most common methods under probability sampling are simple random sampling, stratifies sampling, systematic sampling and cluster sampling and methods such as judgmental sampling, convenience sampling and quota sampling fall under non probability sampling.

The researcher used simple random sampling technique where questionnaires were randomly given to the Bindura Provincial Hospital patients which is subset of a statistical population in which each patient of the subset has an equal chance of being chosen.

### 3.5.2 Data

Data is information that has been translated into a form that is efficient for movement or processing (Barlas, D 2001).

### Primary Data

This is raw data collected for the specific purpose of addressing the research problem at hand. Primary data can be collected in a number of ways. However, the most common techniques are self-administered surveys, interviews, field observation, and experiments. Primary data collection is quite expensive and time consuming compared to secondary data collection.

### Secondary Data

Secondary data are data, which cannot be traced back to the level of individual cases of statistical units. In contrast to primary data, it does not allow for mathematical calculations such as determining an arithmetic mean, a correlation. Sources of secondary data include books, personal sources, journals, newspapers, websites, government records etc. Secondary data are known to be readily available compared to that of primary data. It requires very little research and needs for manpower to use these sources.

### Data Collection instruments

To collect data used to answer the research questions, the researcher uses questionnaires and interviews

#### Questionnaires

The research instrument used was mainly the questionnaire. In conducting a survey where the views of most people are needed, the most appropriate instrument is the questionnaire. Questioners were used in the collection of primary data because of their merits which include those responses are quick and cheap than interviews. The researcher chose this instrument because it was possible to collect data from a large proportion of the sample size. The use of questionnaire was advantageous in that the respondents express their own views as respondents were given enough time to answer questions at their own pace without any pressure as opposed to prompt response on face-to-face interviews where respondents are rushed and end up lost some important information. However, though the questionnaire was effectiveness some did not finish answering few questions. The level of appreciation of the relevant data requirements by the respondents was high in the research.

#### Interviews

Key informal interviews were conducted for further insight into the study so as to capture missing data. In this respect, interviews were conducted with key informants from various universities. Structured Interviews were used and had an advantage clarification. Though it was expensive in terms of time and travel Government Response Change, also interviewing skills were required.

#### Observations

This is a data collection method by which information on a phenomenon is gathered through observation. The nature of the observation could be accomplished either as a complete observer, an observer as a participant, a participant as an observer, or as a complete participant. This method is a key base for formulating a hypothesis.

**Advantages**

* Easy to administer.
* There subsists a greater accuracy with results.
* It is a universally accepted practice.
* It diffuses the situation of an unwillingness of respondents to administer a report.
* It is appropriate for certain situations.

**Disadvantage**

* Some phenomena aren’t open to observation
* It cannot be relied upon
* Bias may arise
* It is expensive to administer
* Its validity cannot be predicted accurately

### 3.5.4 Chi-square Hypothesis Testing

The Chi-square testing between the affirmation that COVID-19 Existence has resulted in affecting the supply chain management of medicinal at Bindura General Hospital. For which, if the results shows that there the alpha is 0 (.0%) and there are no cells that have expected frequencies less than 5, the study will confer the assumption has not been violated and the study assumption will accept the (**H0**) but if the alpha is more than 0.0%, the study will accept the (**H1**) and reject **(H0)**

## 3.6 DATA PRESENTATION AND ANALYSIS PROCEDURE

Before the responses were processed, the questionnaires completed were edited for completeness and consistency. Data collected and analysed and presented using tables and graphical presentations. The data is analysed using SPSS (Statistical Package for Social Science) software and Excel. Liker scale is also used to measure the level of agreement and enabled the interpretation of data.

The study will collect quantitative data through the use of close-ended questions and likert scales and with the aid of SPSS application software, the research is going to present that collected data using the descriptive and inferential statistical methods of data analysis. The research study will present frequency distributions in percentages for the sample size, obtaining mean score rankings and having correlation tests for these variables. The information will then be presented as category frequencies in the form of tabulation, a bar chart, a pie chart or a graph.

Inferential method of analysis was adopted to analyse the impacts of COVID-19 and testing whether there is a co-relation between the existence of the pandemic and the effect it caused in the supply chain of medicinal at the hospital.

## 3.7 RELIABILITY AND VALIDITY

By comparing the supply chains which were affected by covid 19. The researcher determined the data validity of the research instruments by discussing the research instruments with her supervisor. The valuable comments and corrections given by the supervisor assisted her in the validation of the instruments. On data reliability, a hospital study was done on the questionnaires. The hospital study enabled the researcher to yield data concerning deficiencies. Questionnaires do also have some disadvantages like, the wording of questions that may result in wrong interpretation. To try and counter this, the researcher conducted a hospital study first, whereby there was a pre-test of the questionnaire and vagueness clarified. Respondents may not complete the questionnaires. To counter this, the researcher made personal follow-ups. The researcher used semi structured interview questionnaire, which allowed comparisons between respondents. To address the critical issues relating to the quality of research instruments, the interview schedule was pre-tested before being administered to the sampled population. This was to reveal ambiguities, poor worded questions that were too long, unclear choices and also indicate whether the instruments to the respondents were clear. Data reliability was also ensured when the researcher used Statistical Package for Social Sciences (SSPS) in data analysis as a way of ensuring data reliability

## 3.8 ETHICS

The study included only participants who freely consented to participate. During the course of this research study no harm or offence was caused to any participant. The researcher referenced all the used sources from different authors and any data or ideas without due acknowledgement and permissions were not used. Permission to conduct the research was sort from Zimbabwe Revenue Authority’s management before engaging the research. Also, on the questionnaires instructions was given to the respondents that the study was solely for academic purposes. The researcher also took into cognisance the rights of respondents to informed consent, anonymity, privacy, confidentiality and voluntary participation in the study. 22 3.10 Data analysis and presentation procedures Descriptive statistics method of analysis which provides a general overview of the study.

## 3.9 CHAPTER SUMMARY

The chapter reflected on methodology employed to gather data. The chapter played a pivotal role in setting out plan of action. The chapter also defined the population and sampling techniques to be used to select the targeted entities (case study-based professionals who were closely linked to the phenomenon under investigation). The sources of data were discussed and data collection methods followed by the research instrument that would be the best fit to gather adequate and sufficient data.

The chapter also further detailed how the research approach to be used will able to help the study to select the appropriate data analysis techniques for the quantitative and quantitative data needed for the descriptive and explanatory analysis. The reliability and validity procedures as well as ethical consideration were also detailed portraying their necessity and adequacy for the study underway.

# CHAPTER FOUR

# DATA PRESENTATION AND ANALYSIS

## 4.1 INTRODUCTION

The research presents and analyses the data collected through the framework that was created in chapter three (3). This chapter uses descriptive tools and interpretation in accordance to the results produced by the Statistical Package for Social Science (SPSS) application and also utilises the thematic. The research findings are presented in the form of tables, charts and figures where possible. Analysis and discussion of the research findings were both qualitative and quantitative in nature. Data analysis was done using SPSS following the descriptive statistic results. The methodology followed was succinctly discussed in the preceding chapter.

## 4.2 BACKGROUND INFORMATION

### 4.2.1 Response rate

The researcher used questionnaires and interview guide for data collection. Questionnaires were distributed targeting the Stores Clerks, Patients, Medical Superintends, Nurses, Hospital Management and Doctors. The researcher administered 60 questionnaires and 52 were received back recording a response rate of 86.7%. Study also managed to conduct 5 (five) successful interviews with 3 nurses, one doctor and one stores clerk. The study faced limitation in this area due to the challenges caused by limited time and COVID-19 implications. Therefore, the study results should be cautiously treated.

### 4.2.2 Association with the Bindura Provincial Hospital

Figure 4.1 Respondents association with the Hospital

The study observed that from the 52 responses, 17 (32.7%) were nurses and 16 (30.8%) were the hospital management. Only 3 Doctors and 3 Superintends participated in the questionnaire survey as shown in Table 4.1. patients constituted 13.5% of the population and 11.5% were the stores clerks from the procurement department. The results are presented on figure 4.1

### 4.2.2 Gender of the Respondents

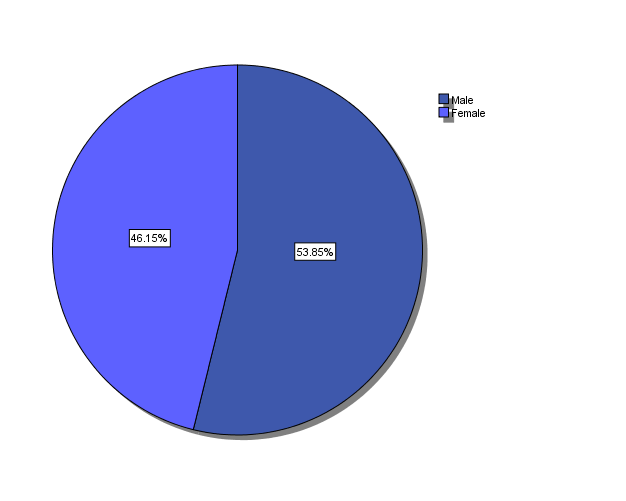


Figure 4.2: The gender of the respondents

Out of the 52 participants, the majority of the respondents were male recording a frequency percentage of 53.9% and females were 46.1%. the study observed that there is a slight improvement in the female participation in the research studies compared to other researches.

### 4.2.3 Age Group Analysis

From these participants, the majority of the respondents are between the ages of 26 to 45 and recorded the highest frequencies of 20 and 18 in the ranges 36-45 (38.5%) and 26-35 (34.6%) respectively. These results increased the confidence in the information provided because the ages of the dominant respondents have enough experience and they are proactive in the field therefore better understanding towards the phenomena under investigation. Least responses came from age groups (18-25) and (46-55) with responding frequency percentages of 15.4% and 11.5% respectively. The information about age frequencies is presented in Table 4.2and as shown by Table 4.1.

Table 4.1: Age group distribution of the respondents:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Age Groups | | Frequency | Percent | Valid Percent | Cumulative Percent |
|  | 18-25 | 8 | 15.4 | 15.4 | 15.4 |
| 26-35 | 18 | 34.6 | 34.6 | 50.0 |
| 36-45 | 20 | 38.5 | 38.5 | 88.5 |
| 46-55 | 6 | 11.5 | 11.5 | 100.0 |
| Total | 52 | 100.0 | 100.0 |  |

### 4.2.4 Working Experiences:

The research recorded the highest frequencies of 22 with percentages of 42.3% for respondents who has been at the hospital 6 to 10 year, followed by frequency distribution of 17 for respondents with 2 to 5 years of experience. Their level of working experience become sufficient for the research because these respondents have been in the industry long enough to give reliable data and understand the procurement systems of medicinal before and after the COVID-19 era. The information is shown in the distribution Figure 4.3.

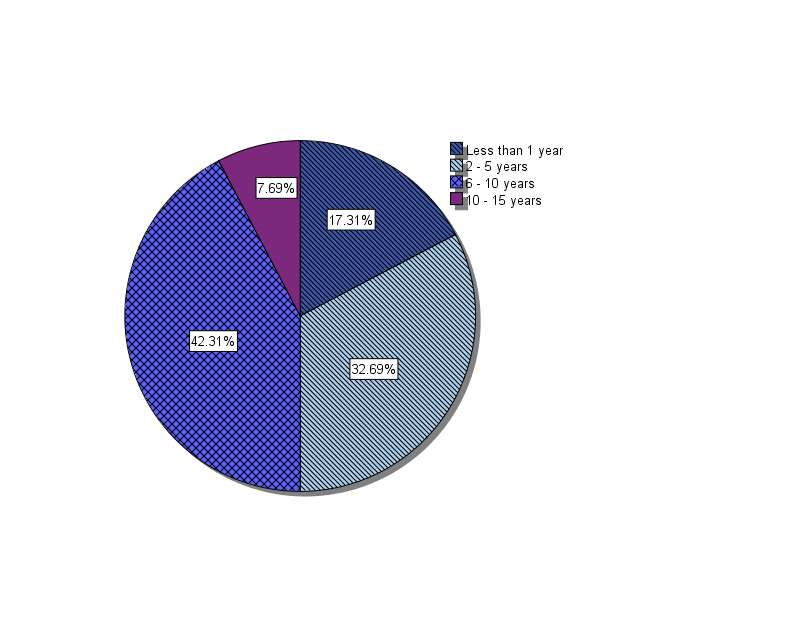


Figure 4.3: Frequency distribution for working experience.

### 4.2.5 Level of education

Figure 4.4 shows the frequency distribution for educational levels were the majority of the respondents with 50.0% managed to obtain a bachelor’s degree on their level of education. The medical professions ensures that the practitioners have adequate and sufficient knowledge and skills to safeguard the health of the general public since the population was characterised by doctors, nurses, managerial team, procurement team among others. The research also recorded a frequency of 17 or 32.7% for professionals who obtained a Diploma whilst marginal results were recorded in other qualifications (17.3%). The distribution is relatively adequate so the study to have a better dependability on the information provided.

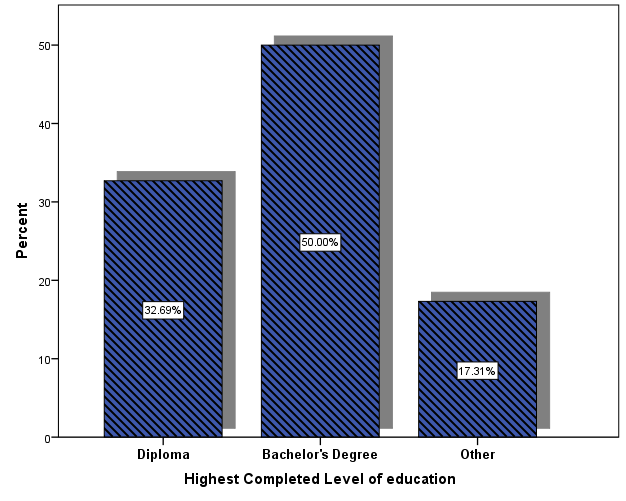


Figure 4.4: The distribution frequency of the respondents’ levels of education.

### 4.2.6 Impact of COVID-19 to the Hospital

The general objective of the research seeks to “*assess the impacts of COVID-19 on the supply chain of medicinal supply at the Bindura Provincial Hospital, in Zimbabwe*”. Therefore, the study assessed whether the coexistence of the pandemic made any significant impact to the general operations at the hospital and this was achieved by asking if they concur to the assumption that the pandemic had negative effects on the medicinal supply chain at Bindura Provincial Hospital. The study recorded a 100.0% affirmation as shown in table 4.2.

Table 4.2: Affirmation to the impact of COVID-19

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Do you agree that the COVID-19 pandemic had negative effects on the medicinal supply chain at Bindura Provincial Hospital** | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Yes | 52 | 100.0 | 100.0 | 100.0 |

The study further explored which departments which were negatively affected by the pandemic most and the results are presented in the figure 4.5 with the highest frequency percentage in clinical and surgery (48.1%) followed by pharmacy and procurement with 25.0% and 23.1% respectively. These results succinctly indicated the areas that highly demanded the medicinal supplies since it is a public hospital. The pandemic also accelerated the demand as the health effects of affected people were severe and fatal. Marginal effect was under the maternity department with frequency percentage of 3.9% because it is the most protected situation and crucial for the nation. The information is presented in figure 4.5

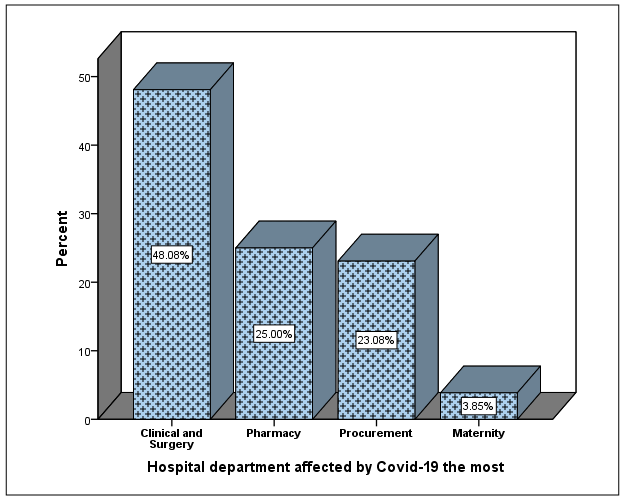


Figure 4.5: Hospital departments affected by COVID-19 the most.

### 4.2.7 Reliability Testing

Reliability is the extent to which data collection methods used such as questionnaires or any measurement procedure yields constant results if repeatedly utilised under the same or similar conditions. The study maximised the Cronbach’s alpha testing to check the reliability of the variables used by the questionnaire and the information if presented in Table 4.3

Table 4.3: Testing Questionnaire variables using the Cronbach’s Alpha testing.

|  |  |  |
| --- | --- | --- |
| **Questionnaire Variables** | **Cronbach’s Alpha** | **N of items** |
| Demographic Information | 0.245 | 7 |
| Effects of covid 19 on the implementation of effective supply chain | 0.372 | 10 |
| Effective strategies | 0.821 | 10 |
| Intervention measures that could be adopted to support sustainable supply chain management | 0.431 | 9 |
| Overall reliability | **0.718** | **36** |

The questionnaire had 36 variables which were all attended by 52 respondents and the study through the Cronbach’s alpha testing recorded the alpha coefficient for thirty-six (21) questions being 0.718, suggesting that the questions have relatively fair internal consistency. According to George and Malley (2003), Cronbach’s alpha greater than 0.70 is considered acceptable in the social science studies therefore, the alpha coefficient 0.718 is reliably acceptable.

## 4.3 EFFECTS OF COVID 19 ON THE IMPLEMENTATION OF EFFECTIVE SUPPLY CHAIN AT BINDURA PROVINCIAL HOSPITAL

The research objective was to “*identify the effects of covid 19 on medicinal supply chain activities at Bindura provincial hospital”* and to achieve this the researcher utilised a likert scale ranging from 1 to 5 representing (*Strong Disagree = 1; Disagree =2; Neutral=3; Agree=4; Strongly Agree=5).* Theresults are presented through the descriptive statistic which managed to arrange the findings through the mean score rankings as shown in table 4.4

Table 4.4 Effects of COVID-19 on medicinal supply chain activities at Bindura Provincial Hospital.

|  |  |  |  |
| --- | --- | --- | --- |
| **Descriptive Statistics** | | |  |
| **Effects of COVID-19:** | **N** | **Mean** | **Rank** |
| Distortions to typical demand due to changes in customer purchasing behaviour. | 52 | 4.53 | 1 |
| Total revenue losses from cancelled surgeries and other Services | 52 | 4.44 | 2 |
| Disruption in the transportation of finished healthcare products through importation and furthermore to general hospitals. | 52 | 4.34 | 3 |
| Lack of Personal Protective Equipment (PPE) and testing kits | 52 | 3.96 | 4 |
| Drug shortages for many vital drugs resulting in higher costs for hospitals | 52 | 3.71 | 5 |
| Lack consumables including medicines and sundries | 52 | 3.67 | 6 |
| Disrupted health supply chains, affecting active pharmaceutical ingredients, shipping and procurements. | 52 | 2.92 | 7 |
| Reduced utilization of health services, and a rising trend towards in maternal and perinatal mortality. | 52 | 2.73 | 8 |
| Reduction in production capacity in health delivery services | 52 | 2.63 | 9 |
| Hospitals have incurred additional costs as they struggle to acquire additional supplies to meet the needs of their patients and staff. | 52 | 2.40 | 10 |
| Valid N (listwise) | 52 |  |  |

Based on the responses collected, the expected mean scores were ranked following the scale of 1.0 to 5.0 representing strongly disagree to strongly agree respectively. The study recorded mean score ranges between 4.53 and 2.40 representing the most affecting to the least affecting effects of COVID-19 on medicinal supply chain at Bindura Hospital. The top five critical effects are:

1. Distortions to typical demand due to changes in customer purchasing behaviour with mean (4.53).
2. Total revenue losses from cancelled surgeries and other Services (M=4.44).
3. Disruption in the transportation of finished healthcare products through importation and furthermore to general hospitals (M= 4.34).
4. Lack of Personal Protective Equipment (PPE) and testing kits (M=3.96)
5. Drug shortages for many vital drugs resulting in higher costs for hospitals (M=3.71)

*“Distortions to typical demand due to changes in customer purchasing behaviour”* which was ranked first as the study observed 53.8% of the respondents “strongly agreed” and 46.2% “agreed” to this perception as a result of COVID-19. The pandemic made general customers to stay home due to stipulated and mandatory lockdown which prevented movements without adequate paperwork hence changed the purchasing behaviour. It was noticeably noted that public transporters, except for those affiliated to a national passenger company were banned. As a result of these changes, the supply chain of medicinal demand was distorted as certain drugs were neglected focusing more to the ones that were connected to the effects of the pandemic at the hospital.

Due to the unforeseen attacks of the pandemic, Bindura Hospital experienced *“Total revenue losses from cancelled surgeries and other Services”.* 55.8% of the population “agreed” to this notion because the majority including the doctors, nurses and first line service providers were scared and some were attacked by the virus to an extent that they were forced to go in isolations hence, it led to cancellation of multiple patient bookings. The effects of COVID-19 were severe and fatal that it attacked all the crucial parts of the nation including the hospital operation despite the fact that the management was working tirelessly making frantic efforts to continue operations safely and preserve COVID-19 safety protocols. The AHA estimates that, as a result of cancelled hospital services due to the COVID-19 pandemic, U.S. nonfederal hospitals stand to lose approximately $161.4 billion in revenue over a period of four months, from March to June 2020

The results recorded 61.5% and 36.5% of the population “agreeing” and “strongly agreeing” respectively to the effect, “*disruption in the transportation of finished healthcare products through importation and furthermore to general hospitals”* caused by the COVID-19 pandemic. The hospital suffered shortages as the procurement department was disturbed in their operation, since the national statutory and global regulations halted the movements of planes, and cargo carriers to cross borders. Extra paperwork and clearance processes were introduced which delayed and also disturbed the importation and transfer of necessary drugs and supplies during their exact times of need. European Pharmaceutical Review, (2020), concurred that COVID-19 disrupted health supply chains, affecting active pharmaceutical ingredients, shipping, procurements, finished healthcare products and more.

Furthermore, the disruptions in the transportation of finished healthcare products also resulted in, 46.2% of the respondents to “agree” that COVID-19 effected, *“Lack of Personal Protective Equipment (PPE) and testing kits”* and also caused *“Drug shortages for many vital drugs resulting in higher costs for hospitals”*. In The Economic Times, (2020) it was also reported that, all these factors cause delays and hamper the supply chain, causing issues in supplies of vaccines, hand sanitisers, testing kits, protective healthcare equipment (PPE), medicines, medical equipment and raw materials. The Bindura Hospital was one of the hospitals that suffered these shorted as reported by the interviewed nurses and doctors. The volumes of COVID-19 patients in addition to general casual patients was substantially increasing immensely on daily basis to an extent that there was an imbalance of supplied PPEs and test kits which led to adverse backlog of operations. The situation was so bad to an extent that, “*some patients were forced to be sent home for home isolation and treatment without fully be attended to”,* said the nurses.

The study also noted the last two (least perceived) effects of the pandemic as follows: “*Reduction in production capacity in health delivery services*” with mean score 2.63 and “*Hospitals have incurred additional costs as they struggle to acquire additional supplies to meet the needs of their patients and staff”* with mean score 2.40. The research discovered that these effects were also influenced by the first five perceived effects of the pandemic and their further effects from other effects so long the hospital administration and management department remained overwhelmed from the prime effects of this attack. One of the management team concurred that the pandemic was one of its kind and it strike harder unforeseen hence the hospital needed urgent strategic and comprehensive planning that was also holistic in natured to manage and stop adverse effects from propagating abnormally.

However, for the study to succumb the effects of the COVID-19 pandemic to the supply chain management at the hospital, the research was further extended to the evaluation of the strategies since there was a call for an urgent strategic and comprehensive planning that was holistic in natured to fight the pandemic. This was done by fulfilling the second research objective in preceding section 4.4.

## 4.4 THE STRATEGIES PUT IN PLACE BY THE HOSPITAL IN CURBING THE IMPACTS COVID-19 PANDEMIC ON SUPPLY CHAIN MANAGEMENT.

The negative impacts of the pandemic discussed in the section 4.3 led the study to comprehensively mobilize enough data through both the close and open-ended questions in the questionnaire, attending to the second specific objective of the research that seek to, “*evaluate the strategies put in place by the hospital in curbing the impacts of the shock from the COVID-19 pandemic on supply chain management”.*

This was achieved by collecting adequate data from the key respondents and the results are presented through descriptive statistics on figure 4.6. following the mean score ranges obtain from a scale of 1 to 5 of the likert scale.

Figure 4.6: Strategies put in place by the hospital in curbing the impacts of COVID-19

The results presented the mean scores from 4.83 to 2.83 representing the most commendable strategies to the least recommended gauging by their effectiveness. The results presented in figure 4.6 showed the top five recommended strategies as follows:

1. Utilization of technological solution through employing a range of digital and analytics solutions (M=4.83).
2. Building redundancy in the supply chain to increase supply chain resiliency(M=4.65).
3. Identifying and prioritizing the list of critical medical supplies/products for a pandemic response (M=4.62).
4. Publishment of a “drug shortage list” consisting of potential COVID-19 treatments and intensive care unit (ICU) medications for COVID-19 patients requiring mechanical ventilation (M=4.48).
5. Conducting risk assessment programs on all the facets and administrative channels of the hospitals (M=4.12)

Firstly, the study observed the following results from the 52 respondents that attended the research questions towards the strategic plan, “*Utilization of technological solution through employing a range of digital and analytics solutions”,* that was ranked first. The results are presented in the table 4.5

Table 4.5. Response frequency distribution.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Utilization of technological solution through employing a range of digital and analytics solutions.** | | | | | | |
| **Responses** | | **Frequency** | **Percent** | **Valid Percent** | | **Cumulative Percent** |
| Valid | Agree | 9 | 17.3 | 17.3 | 17.3 | |
| Strongly Agree | 43 | 82.7 | 82.7 | 100.0 | |
| Total | 52 | 100.0 | 100.0 |  | |

The results concurred that the majority 82.7% “strongly agreed” and only 17.3% “agreed” to the notion that for the hospital to effectively and efficiently managed its supply chain operations, there is need to utilize technology through employment of digital and analytical solutions. This strategy was confirmed as a way to improve supply chain resiliency at a reasonable cost. Mahmoodi *et, al*. (2021), alluded that this can be achieved through a cloud-based supply platform that improves cross-entity collaboration by enhancing information sharing and helping companies avoid price gouging.

In-line with the first strategy which introduced the need for a resilient supply chain system at the Bindura General Hospital, the study furthermore confirmed a second strategy, *“building redundancy in the supply chain to increase supply chain resiliency”* with mean score 4.65. The study recorded the responses frequency distribution of 65.4% and 34.6%, “strongly agreeing” and “agreeing” respectively as shown in table 4.6

Table 4.6. Response frequency distribution.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Building redundancy in the supply chain to increase supply chain resiliency.** | | | | | | |
| **Responses** | | **Frequency** | **Percent** | **Valid Percent** | **Cumulative Percent** |
| Valid | Agree | 18 | 34.6 | 34.6 | 34.6 |
| Strongly Agree | 34 | 65.4 | 65.4 | 100.0 |
| Total | 52 | 100.0 | 100.0 |  |

The management team in conjunction with the procurement team cemented on the idea that building redundancy in the supply chain definitely increases the resiliency introduced by the first strategic plan. At Bindura Hospital, it was seen that the procedures are flexible enough to build redundancy by encouraging the staff to always carry extra inventory of essential health care items. The management also emphasized the idea of holding excess manufacturing capacity for producing critical items as well as contracting with backup suppliers so that there will never be experienced shortages as there was a noticeable effect of excessive demand for PPEs and medical supplies at the hospital. The idea was also accredited by Mahmoodi *et, al*., (2021). Tan, (2002) also recommended the need to turn attention to the medium-term security of the supply base, unlocking funds intelligently and building future-proof resilience in-order to manage the immediate COVID-19 emergency, and also, build stronger and more resilient businesses ready to thrive as economies return to growth.

The third commended strategy was to, “*Identifying and prioritizing the list of critical medical supplies/products for a pandemic response”.* The results recorded response frequencies of 61.5% and 38.5% for which the respondents were “strongly agreeing” and “agreeing” respectively. This comes after building the redundancy and resiliency in the supply chain. The study recognized that the COVID-19 related patients were uncontrollably escalating every single day compared to casual patients there for there was need to identify the needs to calm the burning problems and prioritize the suppliers first without compromising the other needed medical suppliers. Therefore, there was need to effectively and efficiently balance these supplies at an optimized level so that the hospital and pharmaceuticals do not incur losses and negligence. Tan, (2002), alluded that, initial efforts have focused on managing upstream supply disruptions from tier 1 and tier 2 suppliers, while rebalancing short-term sourcing decisions in the light of supply network constraints in Zimbabwe.

The idealist strategy of prioritizing that was previously discussed also recommended another forth strategy of, “*Publishment of a “drug shortage list” consisting of potential COVID-19 treatments and intensive care unit (ICU) medications for COVID-19 patients requiring mechanical ventilation”.* This was specifically aligned to the ministry of public health, finance and the government at large. The strategy enables the government to source and have designated funds towards the pandemic affected patients and hospitals financial assistance to sustainably manage the influx of COVID-19 patients.

Lastly, the study observed the fifth strategy with mean score 4.12, that encourages the hospitals to, “*Conducting risk assessment programs on all the facets and administrative channels of the hospitals”* so that all other formulated solutions and operations will be effectively and efficiently implemented that is sufficiently and sustainable. The response frequencies are shown in table 4.7 where 44 of 52 respondents (84.6%) agreed to this strategy.

Table 4.7. Response frequency distribution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Conducting risk assessment programs on all the facets and administrative channels of the hospitals** | | | | | |
| **Responses** | | **Frequency** | **Percent** | **Valid Percent** | **Cumulative Percent** |
| Valid | Neutral | 1 | 1.9 | 1.9 | 1.9 |
| Agree | 44 | 84.6 | 84.6 | 86.5 |
| Strongly Agree | 7 | 13.5 | 13.5 | 100.0 |
| Total | 52 | 100.0 | 100.0 |  |

The strategy helps the hospital to stabilize their supplies though having a business continuity plans. The initiative demands the hospital to collaboratively work closely together with all the responsive departments to ensure that there are effective communication channels in all levels. The stores clerk confirmed that they have diversified their product portfolio to respond to changing demands, making new products based on their existing resources.

Supplementary to the first most perceived strategies, the study also took into consideration the two least perceived strategies as the follows: *Procurement leaders need to maintain business operations, fulfill urgent demands, and mitigate supplier challenges”* with mean score (2.83) and *“Creating a holistic view of inventory by employing better cooperation, information sharing, and alignment of members”* with mean score (2.96). These strategies were observed to have been incorporated already in the strategic plans and they explore further the angle at which the hospital professional have to be proactive in managing the hospital supplies and operations during the COVID-19 pandemic era in-order to achieve their organizational goals.

## 4.5 INTERVENTION MEASURES THAT COULD BE ADOPTED TO SUPPORT SUSTAINABLE SUPPLY CHAIN MANAGEMENT.

The last research objective was *“to propose possible intervention measures that could be adopted to support sustainable supply chain management during possible health shock in future”* and the responses observed mean scores ranging from 5.0 to 2.8 representing the most voted for to be the most effective ways to the least effective respectively. as shown in Table 4.8. Table also presents the frequencies of the responses towards the degree of their perception where a likert scale was used (SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree and SA = Strongly Agree).

Table 4.8: Response frequencies and mean score ranking for the intervention measure to support sustainable supply chain management.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **INTERVENTION MEASURES** | **N** | **SD** | **D** | **N** | **A** | **SA** | **Mean** | **RANK** |
| Revision of regulatory and reimbursement practices to promote the cost-efficient maintenance of inventories at multiple points in the supply chain. | 52 | 0.0% | 0.0% | 0.0% | 0.0% | 100.0% | 5.00 | 1 |
| Expanding current supply chain visibility into critical public health and other all-hazard-scenario supplies | 52 | 0.0% | 0.0% | 0.0% | 0.0% | 100.0% | 5.00 | 1 |
| Zero import duties for pharmaceuticals and medical supplies and equipment | 52 | 0.0% | 0.0% | 0.0% | 0.0% | 100.0% | 5.00 | 1 |
| Making bold investments in the Zimbabwean public health industrial base | 52 | 0.0% | 0.0% | 0.0% | 11.5% | 88.5% | 4.88 | 4 |
| Enhanced supply by the government should provide increased relaxation on non-hotspot areas for opening up the industries | 52 | 0.0% | 0.0% | 0.0% | 19.2% | 80.8% | 4.81 | 5 |
| Maintaining end-to-end public health supply chain visibility | 52 | 0.0% | 0.0% | 0.0% | 59.6% | 40.4% | 4.40 | 6 |
| Establish standards, systems, and governance to manage the supply chain and ensure fair, equitable, and effective allocation of scarce resources. | 52 | 0.0% | 0.0% | 0.0% | 69.2% | 30.8% | 4.30 | 7 |
| Collaboration with trusted international partners | 52 | 0.0% | 0.0% | 15.4% | 50.0% | 34.6% | 4.19 | 8 |
| Government public health supply chain talent by advancing workforce models that attract and retain talent in biopharmaceutical industry operations and practice | 52 | 0.0% | 30.8% | 34.6% | 34.6% | 0.0% | 3.03 | 9 |
| Valid N (listwise) | 52 |  |  |  |  |  |  |  |

The most perceived intervention measures are:

1. Revision of regulatory and reimbursement practices to promote the cost-efficient maintenance of inventories at multiple points in the supply chain (mean score 5.0)
2. Expanding current supply chain visibility into critical public health and other all-hazard-scenario supplies (mean score 5.0)
3. Zero import duties for pharmaceuticals and medical supplies and equipment (mean score 5.0)
4. Making bold investments in the Zimbabwean public health industrial base (mean score 4.88)
5. Enhanced supply by the government should provide increased relaxation on non-hotspot areas for opening up the industries (mean score 4.81).

The results have presented the top 3 invention measure with mean scores (5.00) as the 52 respondents recorded 100.0% frequency distribution strongly agreeing on these key factors. “*Revision of regulatory and reimbursement practices to promote the cost-efficient maintenance of inventories at multiple points in the supply chain”,* the initiative ensures that there is relaxation in the medical supplies through the statutory instruments publications guiding and encouraging less cost and sustainable operations within the country or medicinal supplies industry. This will also enhance better respond to supply chain disruptions and increased demand through promoting business models that support sustainability, flexibility, and resilience in the domestic industrial base and supply chain. As a result of this measure, this will necessitate, *“Expanding current supply chain visibility into critical public health and other all-hazard-scenario supplies”*.

“*Zero import duties for pharmaceuticals and medical supplies and equipment”* as result will encourage the supplies locally and reduces the shortages as well as monopoly. Once the medical supplies are readily available, the unit costs will be relatively affordable by the general public. In addition to no duty, the government can further “*enhanced supply by increased relaxation on non-hotspot areas for opening up the industries”* locally. These initiatives will hedge each other in the market and ensure that there are no shortages and disruption in the supply chain.

“*Making bold investments in the Zimbabwean public health industrial base*” as the government public health supply chain improves by advancing workforce models that attract and retain talent in biopharmaceutical industry operations and practice; acquisitions and contracting staff; biotechnology development and deployment; and logistics, operations, and sustainment in our nation.

## 4.6 CONCLUSION

The result analysed in this chapter brought a clear view on the impacting effects of COVID-19, the strategies to minimise these effects and suggested the intervention measures to the hospital. The research study was based on an assumption that formulate the following hypothesis:

**H0:** Covid-19 affects the supply chain management of medicinal.

**H1:** Covid-19 does not affect the supply chain management of medicinal.

To valid the test hypothesis, the research study using the guideline from chapter 3.5, section 3.5.5 utilized the Chi-square testing to validate the critical value of comparing the correlations between two independent variables. The variable existence of COVID-19 against the effects COVID-19 to medicinal supply chain as shown in Table 4.9:

Table 4.9 Chi-square hypothesis testing

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Statistics** | | | | | | | | | | |
| TEST VARIABLES AGAINST COVID-19 EXISTENCE | Lack of Personal Protective Equipment (PPE) and testing kits | Lack consumables including medicines and sundries | Reduction in production capacity in health delivery services | Distortions to typical demand due to changes in customer purchasing behavior. | Reduced utilization of health services, and a rising trend towards in maternal and perinatal mortality. | Disrupted health supply chains, affecting active pharmaceutical ingredients, shipping and procurements. | Disruption in the transportation of finished healthcare products through importation and furthermore to general hospitals. | Drug shortages for many vital drugs resulting in higher costs for hospitals | Hospitals have incurred additional costs as they struggle to acquire additional supplies to meet the needs of their patients and staff. | Total revenue losses from cancelled surgeries and other Services |
| Chi-Square | 3.962a | 2.577a | 19.654a | .308b | 33.962c | 16.462c | 27.962a | 18.962c | 11.269c | .692b |
| df | 2 | 2 | 2 | 1 | 4 | 4 | 2 | 4 | 4 | 1 |
| Asymp. Sig. | .138 | .276 | .000 | .579 | .000 | .002 | .000 | .001 | .024 | .405 |
| a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 17.3. | | | | | | | | | | |
| b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 26.0. | | | | | | | | | | |
| c. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.4. | | | | | | | | | | |

The chi-square testing between the affirmation that COVID-19 against the effects COVID-19 to medicinal supply chain gave the results which shows that there the alpha is 0 (.0%) and there are no cells that have expected frequencies less than 5, which conferred the assumption has not been violated and the study assumption **(H0)** has been accepted which concludes that there is a positive relationship between the variables hence COVID-19 has resulted in the adverse effects to the Hospital. Therefore, the study successfully confirmed that supply chain management can be enhanced through the successful implementation of the strategies and intervention measures discussed in this chapter.

## 4.7 CHAPTER SUMMARY

The chapter presented the research findings that were collected using a questionnaire and interviews with respect to case study of Bindura Provincial Hospital in Bindura, Zimbabwe. The study presented the results of effects, strategies and intervention measures to enhance sustainable supply chain management. The chapter also concluded by testing the correlation between two independent variables, the variable existence of COVID-19 against the effects COVID-19 to medicinal supply chain where the study accepted the **H0.** The conclusions for each research objective and recommendations are presented in the preceding chapter.

# CHAPTER FIVE

# CONCLUSIONS AND RECOMMENDATIONS

## 5.1 INTRODUCTION

This chapter provides a summary, a conclusion and suggests possible recommendations based on the findings attained throughout the study. The chapter links the aim, objectives of the study and the research findings. The main objective of the study was to assess the impacts of COVID-19 on the supply chain of medicinal supply at the Bindura Provincial Hospital, in Zimbabwe.

The research specific objectives were; to identify the effects of covid 19 on medicinal supply chain activities at Bindura provincial hospital; to evaluate the strategies put in place by the hospital in curbing the impacts of the shock from the COVID-19 pandemic on supply chain management and to propose possible intervention measures that could be adopted to support sustainable supply chain management during possible health shock in future and these will be suggested by the study as the recommendations to the Supply Chain Management industry. Furthermore, areas of further research will be presented.

## 5.2 SUMMARY OF RESEARCH FINDINGS

First and foremost, the researcher conducted a reliability testing using the Cronbach’s Alpha test method, testing all the variables in the research tool (the questionnaire) and the alpha coefficient was 0.718, greater than 0.7 that is regarded as the acceptable score in social sciences researches. 50.0% of the population was used as the sample size and 60 Questionnaires were administered followed by 5 successful interviews.

The response rate was 86.7% for which the majority were nurses (32,7%) and hospital management (30.8%). Relating to the demographic information collected, 53.9% were males and 46.1% females ranging between the ages of 26 to 45 years with (26 to 35 years) having frequency distribution of 18 (34.6%) and (36 to 45 years) with frequency 18 (38.5%). The working experience of the majority ranged between the 2 to 10 years with 42.3% for 6 to 10 years. 50.0% attained a bachelor’s degree. The research seeks to “*assess the impacts of COVID-19 on the supply chain of medicinal supply at the Bindura Provincial Hospital, in Zimbabwe*” and therefore, a 100.0% was recorded concurring that the pandemic has negative effects on the medicinal supply chain at the hospital and the most affected departments were clinical and surgery as well as pharmacy with frequencies 48.1% and 25.0% respectively.

## 5.3 CONCLUSIONS ON THE RESEARCH OBJECTIVES

Specific objective number one, seeking “*identify the effects of covid 19 on medicinal supply chain activities at Bindura provincial hospital* and the fivemajor findings are:

1. Distortions to typical demand due to changes in customer purchasing behaviour.
2. Total revenue losses from cancelled surgeries and other Services.
3. Disruption in the transportation of finished healthcare products through importation and furthermore to general hospitals
4. Lack of Personal Protective Equipment (PPE) and testing kits.
5. Drug shortages for many vital drugs resulting in higher costs for hospitals

The study concludes that these were the most affecting factors and they were also alluded by the European Pharmaceutical Review, 2020 as well as American Hospital Association. 2020). Hence the supply chain management, hospital management and other professionals have to be aware on these effects and how they have affected the smooth operation of the hospital. The recommendations were drawn at the end of this chapter to succumb these effects.

Objective number two, seeking “*evaluate the strategies put in place by the hospital in curbing the impacts of the shock from the COVID-19 pandemic on supply chain management”* and the fivemajor findings are:

1. Utilization of technological solution through employing a range of digital and analytics solutions.
2. Building redundancy in the supply chain to increase supply chain resiliency.
3. Identifying and prioritizing the list of critical medical supplies/products for a pandemic response.
4. Publishment of a “drug shortage list” consisting of potential COVID-19 treatments and intensive care unit (ICU) medications for COVID-19 patients requiring mechanical ventilation.
5. Conducting risk assessment programs on all the facets and administrative channels of the hospitals.

The research also concluded that it managed to meet this research objective as the respondents managed to give their opinion towards the most effective strategies to minimize the impacts of the pandemic to achieve a sustainable supply chain management. These conclusions moved in major highlights from the reviewed literature. Mahmoodi *et, al*., (2021), gave a precise example that cloud-based supply platforms improve cross-entity collaboration by enhancing information sharing and helping companies avoid price gouging in the supply chain management.

Lastly the research had a mandate to *“to propose possible intervention measures that could be adopted to support sustainable supply chain management during possible health shock in future”* and the major findings are:

1. Revision of regulatory and reimbursement practices to promote the cost-efficient maintenance of inventories at multiple points in the supply chain.
2. Expanding current supply chain visibility into critical public health and other all-hazard-scenario supplies.
3. Zero import duties for pharmaceuticals and medical supplies and equipment.
4. Making bold investments in the Zimbabwean public health industrial base.
5. Enhanced supply by the government should provide increased relaxation on non-hotspot areas for opening up the industries.

The researcher noted that these invention measures are comprehensive and holistic in nature so as to successfully support sustainable supply in hospitals and other related organisations. Also, the study concludes that these intervention measure cement the strategies released by the second objective which has led to the recommendation to the industry as well as to the college.

## 5.4 RECOMMENDATIONS

The last research objective number three, was seeking *“to propose possible intervention measures that could be adopted to support sustainable supply chain management during possible health shock in future”* and the research study managed to recommend both the supply chain management of Zimbabwe as whole and for further studies as follows;

### 5.4.1 Recommendations to the Supply Chain Management Industry:

* There should be zero import duties for pharmaceuticals and medical supplies and equipment encourages the hospitals to effectively acquire the shortages and to increase their supplies.
* The government should be prepared to implement new supply chain situational awareness capabilities and authorities as well as establish a rhythm of regular supply chain illumination, analysis, and mapping.
* The management team should ensure that there are preparedness measures taken and opportunities missed mentioned, such as establishing an effective and reformed centralized procurement.
* The government also ensures that there is development and enforcement of penalties to prevent price-gouging, mandating that data and dealings are maintained online and remain transparent, facilitating effective communication among all stakeholders, initiating and/or expanding local manufacturing practices.
* Building redundancy in the supply chain to increase supply chain resiliency.
* Creating a holistic view of inventory by employing better cooperation, information sharing, and alignment of members.
* Establish standards, systems, and governance to manage the supply chain and ensure fair, equitable, and effective allocation of scarce resources.

### 5.4.2 Recommendations for further studies:

* Firstly, the study can be extended to the investigation of the effectiveness of the suggested factors which are the intervention measure towards unforeseen risks in the supply chain management.
* Also, the study recommends further assessment on impact of government intervening the supply chain operations of private entities such private hospitals and organisations.
* Lastly, the study requires further studies to collectively explore technological and holistic methods to enhance sustain supply chain management.

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## APPENDICES:

## Appendix 1: Declaration letter

My name is Bianca Tafadzwa Kanyere, a final year student of Bindura University doing a Bachelor of Commerce Honors Degree in Purchasing and supply. I am carrying out a research project on the topic entitled: The impact of Covid-19 on the medicinal supply chain.

Please be assured that this research is only for academic purposes. The information you are going to give will be treated with strict confidentiality and will be used only for this study and will not be published. The researcher wish to thank you in advance for your valuable time to complete this questionnaire.

## Appendix 2: Research Questionnaire

**This questionnaire has TWO (2) sections. Please complete ALL the sections.**

**SECTION A: DEMOGRAPHIC INFORMATION**

*For your answer please* ***tick (✓)*** *representing the most appropriate response for you in respect of the following items.*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | |  | |  | |  | |  |  | |  | |  | |  |
|  |  | |  | |  | |  | |  |  | |  | |  | |  |
|  | 1. What is your association with Bindura Provincial Hospital? | | | | | | | | | | | | | | | |
|  |  | |  | |  | |  | |  |  | |  | |  | |  |
|  | Stores Clerk | |  | | Patient | |  | | Medical Superintend |  | | Nurse | |  | |  |
|  |  | |  | |  | |  | |  |  | |  | |  | |  |
|  | Hospital Management | |  | | Doctor | |  | | Other: ……………………………………………………….. | | | | | | | |
|  |  | |  | |  | |  | |  |  | |  | |  | |  |
|  | 1. Which hospital department was affected by Covid-19 the most? | | | | | | | | | | | | | | | |
|  |  | |  | |  | |  | |  |  | |  | |  | |  |
|  | Clinical and Surgery | |  | | Pharmacy | |  | | Procurement |  | | Maternity | |  | |  |
|  |  | |  | |  | |  | |  |  | |  | |  | |  |
|  | 1. Age (years) | | | | | | 1. Highest Completed Level of education | | | | | | | | | |
|  |  | |  | |  | |  | |  |  | | | |  | |  |
|  | 18-25 | |  | |  | |  | | High School Level |  | |  | |  | |  |
|  | 26-35 | |  | |  | |  | | Diploma |  | |  | |  | |  |
|  | 36-45 | |  | |  | |  | | Bachelor's Degree |  | |  | |  | |  |
|  | 46-55 | |  | |  | |  | | Doctorate Degree |  | |  | |  | |  |
|  | 56 and Above | |  | |  | |  | | Other |  | |  | |  | |  |
|  |  | |  | |  | |  | |  |  | |  | |  | |  |
|  | 1. Gender | | | | | | 1. Working Experience | | | | | | | | | |
|  |  | | | | | |  | |  |  | |  | |  | |  |
|  | Male | |  | |  | |  | | Less than 1 year |  | |  | |  | |  |
|  | Female | |  | |  | |  | | 2 - 5 years |  | |  | |  | |  |
|  | Other | |  | |  | |  | | 6 - 10 years |  | |  | |  | |  |
|  |  | |  | |  | |  | | 10 - 15 years |  | |  | |  | |  |
|  |  | |  | |  | |  | | 16 and above |  | |  | |  | |  |
|  | |  | |  | |  | |  | | |  | |  | |  | |

**SECTION B: PERCEPTIONS ON THE IMPACTS OF COVID 19 PANDEMIC IN THE MEDICIANAL SUPPLY CHAIN.**

**B1: STAFF OPION ON THE EFFECTS OF COVID 19 ON MEDICINAL SUPPLY CHAIN ACTIVITIES AT BINDURA PROVINCIAL HOSPITAL.**

1.  Do you agree that the COVID-19 pandemic had negative effects on the medicinal supply chain at Bindura Provincial Hospital? *Please* ***tick (✓)***

Yes No

2. To what extent do you concur to the following statements describing the effects of covid 19 on the implementation of effective supply chain at Bindura Provincial Hospital? *Please* ***tick (✓)*** *the number representing the most appropriate responses for you. (Strong Disagree = 1; Disagree =2; Neutral=3; Agree=4; Strongly Agree=5)*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Statement** | **1** | **2** | **3** | **4** | **5** |  |
| Lack of Personal Protective Equipment (PPE) and testing kits |  |  |  |  |  |  |
| Lack consumables including medicines and sundries |  |  |  |  |  |  |
| Reduction in production capacity in health delivery services |  |  |  |  |  |  |
| Distortions to typical demand due to changes in customer purchasing behavior. |  |  |  |  |  |  |
| Reduced utilization of health services, and a rising trend towards in maternal and perinatal mortality. |  |  |  |  |  |  |
| Disrupted health supply chains, affecting active pharmaceutical ingredients, shipping and procurements. |  |  |  |  |  |  |
| Disruption in the transportation of finished healthcare products through importation and furthermore to general hospitals. |  |  |  |  |  |  |
| Drug shortages for many vital drugs resulting in higher costs for hospitals |  |  |  |  |  |  |
| Hospitals have incurred additional costs as they struggle to acquire additional supplies to meet the needs of their patients and staff. |  |  |  |  |  |  |
| Total revenue losses from cancelled surgeries and other Services |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

Other: ……………………………………………………………………………………………………………………………………………………………………………………………………………………….

**B2: STAFF OPINION ON THE STRATEGIES PUT IN PLACE BY THE HOSPITAL IN CURBING THE IMPACTS OF THE SHOCK FROM THE COVID-19 PANDEMIC ON SUPPLY CHAIN MANAGEMENT.**

To what extent does the following statements evaluate the effective strategies put in place by the hospital in curbing the impacts of the shock from the COVID-19 pandemic on supply chain management?

*Please* ***tick (✓)*** *the number representing the most appropriate responses for you in respect of the following statements.*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |
|  | STATEMENT | | | | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  | | | | 1 | 2 | 3 | 4 | 5 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 1. Conducting risk assessment programs on all the facets and administrative channels of the hospitals | | | | 1 | 2 | 3 | 4 | 5 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 1. Implementation of business continuity plans such as direct purchases of needed supplies. | | | | 1 | 2 | 3 | 4 | 5 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 1. Diversification of their product portfolio to respond to changing demands, making new products based on their existing resource. | | | | 1 | 2 | 3 | 4 | 5 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 1. Building redundancy in the supply chain to increase supply chain resiliency. | | | | 1 | 2 | 3 | 4 | 5 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 1. Utilization of technological solution through employing a range of digital and analytics solutions. | | | | 1 | 2 | 3 | 4 | 5 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 1. Creating a holistic view of inventory by employing better cooperation, information sharing, and alignment of members. | | | | 1 | 2 | 3 | 4 | 5 |  |
|  | 1. Publishment of a “drug shortage list” consisting of potential COVID-19 treatments and intensive care unit (ICU) medications for COVID-19 patients requiring mechanical ventilation. | | | | 1 | 2 | 3 | 4 | 5 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 1. Full engagement of government, private parties, the local community and global village in fighting against COVID-19 | | | | 1 | 2 | 3 | 4 | 5 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 1. Identifying and prioritizing the list of critical medical supplies/products for a pandemic response. | | | | 1 | 2 | 3 | 4 | 5 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 1. Procurement leaders need to maintain business operations, fulfill urgent demands, and mitigate supplier challenges. | | | | 1 | 2 | 3 | 4 | 5 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

Other: ……………………………………………………………………………………………………………………………………………………………………………………………………………………….

**B3: STAFF OPINION ON INTERVENTION MEASURES THAT COULD BE ADOPTED TO SUPPORT SUSTAINABLE SUPPLY CHAIN MANAGEMENT**

To what extent do you concur to the following intervention measures that could be adopted to support sustainable supply chain management during possible health shock in future? *Please* ***tick (✓)*** *the number representing the most appropriate responses for you. (Strong Disagree = 1; Disagree =2; Neutral=3; Agree=4; Strongly Agree=5)*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Statement** | **1** | **2** | **3** | **4** | **5** |  |
| Maintaining end-to-end public health supply chain visibility |  |  |  |  |  |  |
| Zero import duties for pharmaceuticals and medical supplies and equipment |  |  |  |  |  |  |
| Enhanced supply by the government should provide increased relaxation on non-hotspot areas for opening up the industries |  |  |  |  |  |  |
| Expanding current supply chain visibility into critical public health and other all-hazard-scenario supplies |  |  |  |  |  |  |
| Making bold investments in the Zimbabwean public health industrial base |  |  |  |  |  |  |
| Government public health supply chain talent by advancing workforce models that attract and retain talent in biopharmaceutical industry operations and practice |  |  |  |  |  |  |
| Revision of regulatory and reimbursement practices to promote the cost-efficient maintenance of inventories at multiple points in the supply chain. |  |  |  |  |  |  |
| Collaboration with trusted international partners |  |  |  |  |  |  |
| Establish standards, systems, and governance to manage the supply chain and ensure fair, equitable, and effective allocation of scarce resources. |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

Other: ……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

**Thank You**