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Effect of COVID 19 pandemic on Pharmaceutical Industry in terms of Inventory and Logistics Management

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Abstract

The World Health Organization (WHO) declared COVID-19 a pandemic on 11th March 2020, after the outbreak that was first reported in Wuhan, China in December 2019. The COVID-19 pandemic affected world economy including the pharmaceutical sector. The health crisis unleashed in the world because of this pandemic and the attempts of various countries and organizations in the world to contain it have also fuelled the greatest economic crisis in modern history. This significant fall in world trade in goods and services have been triggered by the interruption and break down of local and global supply chains, generating high levels of unemployment worldwide, exacerbating social inequalities and dramatically increasing extreme poverty in the world by more than 90 million.

The pharma industry plays a pivotal role in the provision of quality healthcare services, especially during pandemics, when supply chain can be overwhelmed or shut down due to the various reasons. The Indian domestic pharma industry is highly dependent on imports, with more than 60% of its API requirements being imported.

The study is focused on this pandemic's effect on normal manufacturing activity in terms of inventory and logistics management in pharmaceutical industries restricted to West Bengal, India more precisely in M/s EIPWL, which has been selected as a model for this study. Five specific products of M/s EIPWL have been selected for this study. To manufacture of these products, 2 basic raw materials along with 3 excipients are imported and other raw and packaging materials are being procured form different states of India. Capturing yearly data of marketing department requirements' visa-vis production of respective products for the last 5 years has been started. The study is trying to find Time Series data analysis of demand and production of the respective products and production loss owing to shortage of supply and input materials. So far it has been observed that shortage of manpower and inventory due to disruption of supply chain in pandemic situation is responsible for antagonistic effect of normal activity in production and inventory management.

Keywords: Covid-19, Supply Chain Disruption, Pharmaceutical industry, Inventory management.

Introduction

The pharmaceutical industry is a very important component of the global economy. The long-term growth potentials of the industry remain upbeat given growing and aging population, emerging medical conditions, and emergence of new diseases. The Indian pharma industry has achieved significant growth in both domestic and global markets during the past five decades. From contributing just 5% of the medicine consumption in 1969 (95% share with global pharma), the share of "Made in India" medicines in Indian pharma market is now a robust 80% in 2020. More importantly, during the same period, the country has also established leading position in the global generic pharmaceuticals landscape and is now known as the "Pharmacy of the world". The pharma industry in India contributes more than 20% by volume of global generics market 62% of global demand for vaccines. The Indian domestic pharmaceutical market size has reached US$20.3 billion in 2019 with growth of 9.8% (market size of US$18.12 b in 2018). The domestic market has grown at 2.2% during April-Sept 2020 compared to the same period last year despite a sluggish start to the year due to the pandemic. Indian pharma exports reached US$20 billion in FY20 with year-on-year growth of 8.4% (1).

The World Health Organization (WHO) declared COVID-19 infection, i.e., Severe Acute Respiratory Coronavirus infection (SARS-CoV-2) a pandemic on March 11, 2020, after the outbreak of flulike infection was first reported in Wuhan, China in early December 2019. As countries and companies alike continue to grapple with the unprecedented challenges thrown up by the novel coronavirus (COVID-19), a specific area of concern has been the uncertainty surrounding the impact of the COVID-19 pandemic on the global as well as Indian pharma industry supply chain.

India imports about 70-75% of APIs and key starting raw materials from China, the world's leading producer and exporter of APIs by volume, for meeting the bulk requirements. Due to supply chain disruption, the cost has surged by 40-50% in India for medicines such as paracetamol, penicillin, and anti-asthma drugs. The pharmaceutical units were operated at 40-50% of their capacities because of unavailability of workforce and curtailment to only one shift at various plants. The restrictions on usage of public transport as well as requirement for passes for traveling have also affected movement of workers and they found it difficult time to reach the manufacturing units. The non-availability of transportation facility for dispatching materials was another major challenge during the period. The ancillary industries to pharma industry including some of the packaging materials for medicines were yet to be brought under the purview of essential services. This posed a serious challenge to packaging vendors to source their raw materials for making the medicine packages and this could be a significant impact on pharmaceutical production. The slowdown in imports has also affected the innovative drug development (2).

The organization like EIPWL (East India Pharmaceutical Works Limited) also faced same kind of challenges starting from initial days of lock down to full and partial restrictions during the pandemic. This study shows the nature of inventory management of some major products of the organization and how it reflects the production and business of the company.

Literature Review:

The Covid-19 pandemic affected world economy including the pharmaceutical sector. Currently there is no specific treatment guideline and medicine to treat the Novel Corona virus infection. Pharmaceutical industry is assisting governments to address the Covid-19 unmet needs including research and development activity on potential treatment strategies to balance medicine supply chain at the time of crisis [3].

Pandemics such as Covid-19 are associated with high rates of morbidity and mortality which negatively affected the socioeconomic status and livelihoods of communities. The pharmaceutical industry plays a very important role to produce quality healthcare services, especially during pandemics, when medicines supply chain can be overwhelmed due to varying reasons. These include over-reliance on traditional manufacturing and distribution routes such as India and China [4].

Furthermore, lockdowns as in during the early days of Covid-19 pandemic, led to restriction of in-county and cross border movements, which had a huge impact on how pharmaceutical supplies that are transported and delivered during the period [5].

APIs and other active ingredients required to manufacture drugs by the Indian manufacturers are mainly sourced from India and China due to Covid-19 related interruption an acute shortage of APIs was started from May 2020, because most of the manufacturing companies maintain 2-3 months stock of bulk drugs [6].

Shortage of APIs and other active ingredients had impacted the capacity of many of Indian pharma manufacturing units by 20-30% of normal production capacity. There were also indications that the costs of acquiring APIs were increasing. Lockdown and governmental guidance on physical distancing in workplace and some other challenges unique to local contexts that had prevented the manufacturing companies from operating at 100% capacity. Generally, a typical pharmaceutical company hold up inventories up to 180 days [6]. Retail drug stores allow inventory holding period up to 60 days or less.

Covid-19 may be seen as a century's opportunity for pharmaceutical industry as it increases the demand for prescription medicines, vaccines, and medical devices. Demand change, supply shortage due to shortage of inventory of input materials to manufacture drugs, panic buying and stocking, regulation changes and shift of communication and promotions to remote interactions through technology and research & development process changes can be seen as immediate impact of Covid-19 on health care industry. Demand change, which leads to shortage in the case of induced demand and panic-buying of oral home medication specially for chronic disease may be due to the pandemic and shortages in supply-chain inconsistency [7]. The study reported that induced demand in global pharmaceutical market

mainly due to "panic-buying" of pharmaceuticals for chronic disorders was estimated +8.9% by March 2020 [8]. A study in USA indicated that for 13th to 21st of March 2020, asthma medications sparked by 65% and type2 diabetes increased by 25% [9]. This shortage has already begun to affect APIs and bulk prices in Indian trades. The average increase was reported to be about 10 to 15 % however it may reach to 50% in some specific cases like APIs of paracetamol [10].

The pharmaceutical sectors are struggling to maintain natural market flow as the recent pandemic affects the access to essential medicines in an affordable price, which is the main goal of every pharmaceutical industry [11]. Coronavirus pandemic resulted in economical slow-downs for many countries, and this will possibly lead to pharma industry growth slow-down [12]. The international shipping disruption increased supply chain cost, local freight charges, air and sea fair also increased due to the delay in shipping.

Research Methodology:

The purpose of this paper is to identify the impact of Covid-19 on inventory management of pharmaceutical manufacturing company in India, especially in state of West Bengal. In the initial stage of this study, a medium sized pharma manufacturing company EIPW Limited in West Bengal has been selected as a sample.

The research focused on the comparative's analysis of production and turnover which is divided into product- wise category in consecutive three financial years i. e. 2018-19, 2019-20 & 2020-21. Also, month-wise production data was also collected and analysed to find out the impact of inventory in pre and during Covid-19 period.

Uncertainty is the major concern to control the inventory. So, the methods to obtain the actual data of the products are most of the time difficult. In this course of study, attempt has been made to identify the most valuable products which contribute major share of the company's turnover. EIPWL has 80 active products in the domestic market. ABC analysis [13] has been done with 80 products to categorise the products in three major groups; A, B, C; A being the most valuable items towards the contribution in company's annual turnover, C being the least valuable items.

The major contributing products to its turnover have been selected. The study focused the effect of pandemic on normal activity in terms of inventory and logistics management. It also emphasized the global and local impact of inventory and supply chain management.

Results and Discussion:

EIPWL is a medium sized pharmaceutical company with turn over around 200 cores. ABC analysis has been done with the products to find out the main contributing products to the turnover of EIPWL. Based on the analysis, 10 main contributory products have been selected, those of which contribute almost 70% of its turnover.

Data has been collected of the 10 identified products based on their target production and actual production in the three consecutive years starting from 2018-2019, 2019-2020 and 2020-2021 to find out the Covid-19 effect on its production. Table -1 data shows that the production achievement against target is more than 100% in some of items and almost 90% for the rest of the products in the financial year 2018-2019.

The pandemic has started in India from March 2020. Government of India declared lockdown in the last week of March. So, the effect of pandemic did not have any major impact on the production of pharmaceutical industries in the financial 2019-20. In EIPWL also it has been seen that baring three products all other seven items production achievement was also around 90%.
The sudden outbreak of Covid-19 pandemic has disrupted supply chain management in pharmaceutical industry and production has been badly affected due to the shortage of raw and packaging materials. In the year 2020-21 percentage of achievement of production" vs "target" dropdown drastically (Table-1) in almost all products, which has a direct impact on sales and turnover. The expected long-term impacts of Covid-19 at both global and national levels could be, the slowdown of growth, authorization delay, heading towards self-sufficiency in supply chain of production and trend shifted in health-items use along with the ethical dilemma [7].

Table 1: <u>Comparative study of Target Production vs. Actual Production of ten major products of EIPWL.</u>

Sl. No.	Product With Indications	Financial Year								
		2018 - 2019			2019 - 2020			2020 - 2021		
		Target Production	Actual Production	% Achievement	Target Production	Actual Production	% Achievement	Target Production	Actual Production	% Achievement
01.	EQL 20 tablet strip (Antiamiobiosis)	21000000	22867425	109	24000000	22631895	98	24000000	19184895	87
02.	PGC 500 10 tablet strip (Antipyrtic)	11000000	10763299	98	10500000	9803921	93	12000000	8705606	73
03.	PGC 650 10 tablet strip (Antipyrtic)	7000000	5723793	82	6500000	6492776	100	9000000	6089010	68
04.	PGC 1000 10 tablet strips (Antipyrtic)	2500000	2501555	100	2500000	2292626	92	4500000	3002600	67
05.	VZM Drops 15 ml (Digestive)	1700000	1618120	95	1500000	1636600	109	1700000	1516738	89
06.	VZM Syrup 200 ml (Digestive)	3800000	3668684	96	3900000	3508753	90	3800000	3372224	88
07.	VZM Capsules 10 Cap. (Digestive)	1500000	1482560	98	2000000	1636540	81	2000000	1524280	76
08.	TFN Drops 15 ml (Anti anemic)	2650000	2587150	97	2700000	2544650	94	2900000	2254200	77
09.	TFN Syrup 200 ml (Anti anemic)	1800000	2010889	111	1900000	1250530	65	1900000	1387742	73
10.	Keralin 15 gm (Kerotolytic)	800000	646428	81	800000	777318	97	800000	463200	57

The volume of production and turnover of 10 major selected products have been analysed in 3 consecutive financial years (Table – 2). China is the major raw material supplier in India, almost 70% of APIs comes from China. Imports of active pharmaceutical ingredients almost been halted due to government-imposed lockdown in India from March-2020. The disruption of the supply chain caused concerns of the shortage of pharmaceutical raw materials among the local drug manufacturers [14]. This effect is evident from the data obtained (Table – 2) in EIPWL case study where the turnover for each product was impacted in the said period.

Table 2: <u>Comparative study of Production and Turnover for consecutive two financial years.</u>

Sl. No.	Product With Indications	Financial Year								
		2018 - 2019			2019 – 2020			2020 - 2021		
		Value per Unit	Volume in Number	Total Turnover in Cr.	Value per Unit	Volume in Number	Total Turnover in Cr.	Value per Unit	Volume in Number	Total Turnover in Cr.
01.	EQL 20 tablet strip (Antiamiobiosis)	21.54	22867425	49.25	23.66	22631895	53.54	25.96	19184895	49.80
02.	PGC 500 10 tablet strip (Antipyrtic)	5.90	10763299	6.35	6.12	9803921	5.99	6.41	8705606	5.58
03.	PGC 650 10 tablet strip (Antipyrtic)	12.02	5723793	6.87	12.46	6492776	8.08	12.96	6089010	7.89
04.	PGC 1000 10 tablet strips (Antipyrtic)	16.07	2501555	4.01	17.36	2292626	3.98	19.93	3002600	5.98
05.	VZM Drops 15 ml (Digestive)	41.14	1618120	6.65	43.07	1636600	7.04	45.00	1516738	6.82
06.	VZM Syrup 200 ml (Digestive)	51.43	3668684	18.86	54.00	3508753	33.24	62.36	3372224	21.02
07.	VZM Capsules 10 Cap. (Digestive)	37.29	1482560	5.49	39.86	1636540	6.52	46.29	1524280	7.05
08.	TFN Drops 15 ml (Anti anemic)	44.36	2587150	11.47	46.29	2544650	11.77	48.21	2254200	10.86
09.	TFN Syrup 200 ml (Anti anemic)	74.57	2010889	14.99	79.07	1250530	9.88	91.93	1387742	12.75
10.	Keralin 15 gm (Kerotolytic)	50.79	646428	3.28	54.00	777318	4.19	61.07	463200	2.82
				120.35			144.23			130.57

In the Table-3 the percentage change of production in 2020-21 shows a negative trend for most of the products due to the shortage of imported raw materials specially iodine and paracetamol which are the basic ingredients of EQL and PGC group of products respectively which are imported mostly from China. The shortage of production of essential drugs increases scarcities in the market. The negative growth impacted on business of the company. This problem was addressed in EIPWL by taking some measures. One of them is to increase the price of non-scheduled drugs. Second approach is to enhance the production of products related to covid management. Here the production volume of paracetamol 1000 was enhanced with limiting raw materials by giving it priority for its requirement in covid treatment (Table-3). In early March 2020 the consumer's spending pattern increases for about 20% regarding the essentials e.g., groceries, discount stores and pharmacies. All pharma companies increased the price of the products and it been observed along with a shortage of pertinent medicines. The medicines that help to mitigate Covid-19 effect are assumed to reach a high price [15].

In this study from the it has been observed that EIPWL has also increased the price of the medicines except the price control drugs. The increase in price was due to the increased logistic expenses and to reach the targeted turnover. From the Table -3 it has been observed that the change in production in the year 2020-21 was negative for most of the products compared to financial year 2019-20. Government imposed restrictions and local restrictions due to the pandemic situation the production was hampered as the procurement lead time was unexpectedly long. In the lockdown period most of the ancillary companies were shut down barring the Pharma and other essential industries. In the initial state of lockdown period most of the packaging industries were shut down due to the Government imposed restrictions. The packaging materials are procured mostly from the local market and the pharma companies hold up inventory at the most one month. Consequently, due to shut down of the packaging industry in the lockdown period, the procurement was challenging, and the shortage of packaging material was also one of the major causes for loss of production.

Table 3: <u>**Percentage change of Production and Turnover in the two consecutive financial years.**</u>

Sl. No.	Product with indications	Financial Year			
		2019-2020		2020-2021	
		% Change of Production	% Change of Turnover	% Change of Production	% Change of Turnover
01.	EQL 20 tablet strip (Antiamiobiosis)	-1.02%	+8.71	-15	-6.98
02.	PGC 500 10 tablet strip (Antipyrtic)	-8.91	-5.66	-11.2	-6.84
03.	PGC 650 10 tablet strip (Antipyrtic)	+13.4	+17.6	-6.21	-2.35
04.	PGC 1000 10 tablet strip (Antipyrtic)	-8.35	-0.7	+30.96	+50.25
05.	VZM Drops 15 ml (Digestive)	+1.14	+5.86	-7.32	-3.125
06.	VZM Syrup 200 ml (Digestive)	-4.35	+76.2	-3.89	-36.7
07.	VZM Capsules 10 Cap. (Digestive)	+10.38	+18.7	-6.85	+8.12
09.	TFN Drops 15 ml (Anti anemic)	-1.64	+2.61	-11.41	-7.73
08.	TFN Syrup 200 ml (Anti anemic)	-37.8	-34.08	+10.9	+29.04
10.	Keralin 15 gm (Kerotolytic)	+20.2	+27.7	-40.4	-32.6

Conclusion

Covid-19 has clearly highlighted the importance of a strong health care system and health management policy. The lack of both can put any nation's economy and society at risk. As India continues to fight the covid pandemic and stabilize its economy, it is the perfect time for the pharma industry to apply learning from the challenges and best practices that emerged during pandemic. This research is designed to investigate the challenges, that Pharma industries faced, to manage its' supply chain management and production, during Covid-19 period. To emerge as a winner in the post covid world the industry needs to continue building up its strength. New capabilities need to be introduced across the business functions to bring efficiencies in the value chain. Government also needs to provide the favourable business environment for proper growth of the industries.

Acknowledgement

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