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A Meta-Analysis On Effect On The Economy Due To Labour Loss During Epidemic Outbreaks

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Abstract - This study examines the available information on the relation between the epidemic outbreak and labour loss that happened in the foregoing years. This study is done on the phenomenal changes in labour market investigated during various epidemic situations in the world. This work will be an analysis to understand how the observed consequences of labour loss and its effect on the economy. This study has attempted to understand the present situation of the labour movement and labour loss due to COVID-19 outbreak followed by lockdown in India.

Keywords: COVID-19, Economy, Employment, Epidemics, Human resource, Labour market, Lockdown, Pandemic, Quarantine, Unemployment.

I. Introduction

COVID-19 Novel Coronavirus is declared as a pandemic by the World Health Organization (WHO) because of its unusual fast rate of spreading. At the time of writing this paper, this virus has affected more than two and half a million people worldwide.

One should understand the difference between an epidemic and a pandemic.

Epidemic: It is an outbreak of disease that spreads quickly and affects many individuals at the same time.

Pandemic: It is a type of epidemic which is spread across an entire country or world.

WHO has given a List of 20 epidemic diseases which can become a pandemic.

The human race has dealt with various epidemic and pandemic across the centuries. Epidemic diseases have caused a series of physical, psychological and economical effect on people. People are physically affected by being a victim of the disease. The psychological effect of the epidemic among people is huge, people are afraid of being vulnerable to disease, worried about their livelihood, hygiene, social security, Job and family and largely anxious about their family and future[1]. Loss of human life and the spread of epidemic have larger repercussions on the national and regional economy. Nation's economy is impacted through several channels like health, transport, tourism, agriculture, etc[2].

Chikungunya	Monkeypox
Cholera	Nipah virus infection
Crimean-Congohaemorrhagic fever	Novel coronavirus (2019-nCoV)
Ebola virus disease	Plague
Hendra virus infection	Rift Valley fever
Influenza (pandemic, seasonal, zoonotic)	SARS
Lassa fever	Smallpox
Marburg virus disease	Tularaemia
Meningitis	Yellow fever
MERS-CoV	Zika virus disease

All enterprises regardless of size are facing serious challenges. Sustaining business operations particularly in Micro, Medium and Small Enterprises (MSMEs) are difficult. Following the lockdown, border closure and quarantine measures many workers cannot carry out their jobs which has a huge effect on their income particularly for the casual and informal workers.

According to the International Labour Organization, the epidemic shocks will affect the labours in three key dimensions[3].

I. Quality of the job of both employed and unemployed.

[1] Dumont, D. M., Brockmann, B., Dickman, S., Alexander, N., & Rich, J. D. (2012). Public health and the epidemic of incarceration. Annual review of public health, 33, 325-339.

2 Hays, J. N. (2005). Epidemics and pandemics: their impacts on human history. Abc-clio.

3 https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_738753 .pdf

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II. Quality of work that affects their income and social protection.
III. Effect on the group of labours who are vulnerable to adverse labour market outcomes.

Considering the necessity of the availability of labour for the development of the economy, it is essential to understand how the availability of labour affected the economy during the past epidemic and pandemic outbreaks. This will help us to categorise and formulate necessary relief measures to help bring down the labour loss and uplift the economy.

II. Research Methodology

Meta-Analysis is a formal epidemiological study design which is systematically used to access the result of previous research to derive conclusions on the body of research. This type of analysis will help in improving statistical significance.

A systematic review of literature is done and a summary of findings from other individual studies on the topic is listed in this article.

III. Review

According to a research paper " Pandemic Risk: How large are the estimated losses?"[4] Published in the bulletin of WHO stated that economic studies on global pandemics focused on income losses reduction in the size of labour, productivity and increase in absenteeism which are the causes for disrupting of economic activity.

According to "A world at Risk: Annual report on global preparedness for health emergencies"[1] prepared by WHO and World Bank in September 2019 estimated that a global influenza pandemic will cost $3 trillion to the modern economy and the GDP of South Asia will drop by $ 53 Billion.

The outbreak harmed the economy and resulted in the reduction of demand for labour[2]. This leads to lower-income which effected the overall GDP and demand for labour. Epidemic outbreaks affect the availability of labour which will dampen potential growth, the difference in demand and supply has an impact on prices[4].

WHO guide to identify the economic consequences of disease and injury (2009) [13] states that

- GDP will be focused as the economic study will have an impact at the social level.
- During the disease outbreak macroeconomic performance is impacted by key channels such as health expenditure, labour, loss in productivity and restricted capital formulation.
- An outbreak of spreading infectious disease and public perception of the risk of getting infected will lead to a large change in patterns of social and economic interchanges.
- Reduction in labour supply influences the operating activities of the firm. The firm has to have additional workers to replace those that got sick to maintain the current levels of production
- Health status of labour affects the productivity and economic growth in different channels.

An article on " Economic Impact of Epidemics and pandemics"[16] published in European parliamentary research service specifies that losses will take place through the reduction in the hire of the labour force and productivity as a result of individual and social measures to avoid the cause of transmission.

During the epidemic outbreak urban labour market experience a direct effect due to the reduction in employment, the rural labour market is indirectly affected due to a decline in consumption[5]. There is a close relationship between employment and epidemic disaster. Infectious disease will affect the employment of vulnerable group on a large scale.

Lee, A., & Cho, J. (2017) [6] states that the current level of employment and unemployment will determine the standard of living, disposable income, education, health, savings and psychological level of the society. Hence it is important to study on employment concerning the pandemic disaster.

When there is an epidemic breakout the country's labour market is affected directly and indirectly. Lee and Mc Kibbing (2004) [8]

- The direct effect is caused due to a decrease in labour because of morbidity, mortality and fear of contagion.
- The indirect effect is caused due to people's behavioural changes which include avoiding consumption resulting in the decline of goods and services which directly leads to domestic Unemployment.

Eichel Berger (2007) [3] Conducted a study during SARS in 2003 states that the economy is not only affected by high mortality and conformation of infectious disease but also the fear of spread through rumour and mass media.

Sharma & Krishna (2007) [11] points out that urban and rural poor who are dependent on their daily wages are vulnerable to disaster.

World Bank (2014) [14] indicated that an epidemic outbreak can affect the economy directly through reduced

4 Economics, O. (2010). Economic impact of a cholera epidemic on Mozambique and Bangladesh. A report for the International Vaccine Institute.

5 Lee, A., & Cho, J. (2017). The impact of city epidemics on rural labor market: The Korean Middle East Respiratory Syndrome case. Japan and the World Economy, 43, 30-40.

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labour supply and indirectly through behavioural changes due to fear of contagion which reduces labour force participation. The SARS outbreak between 2002 & 2004, H1N1 flu epidemic in 2009 resulted in behavioural effects which caused 80-90% impact of contagious disease on the economy.

If the outbreak of pandemic disease is not addressed collectively, the domestication and implementation of sustainable development goals in the country will be at risk[6]. The cost of the pandemic on GDP is very high, the loss in GDP and per capita income will affect the jobs and livelihood resulting in a negative impact on household survival.

Warwick. J. Mckibbin (2006) [10] studied the implication of pandemic influenza outbreak on the global economy through a range of scenarios taking the historical experience of influenza in the 20th century.

This study states that there will be a fall in the labour force to different degrees in different countries based on mortality and morbidity. Even a mild pandemic has significant consequences on the global economy.

This study used Asis Pacific G-Cubed (APG Cubed) model considering 20 countries with 6 sectors of production.

Scaling of shocks is done based on the exposure of individual service industries within the aggregate service sector.

Shocks defining each scenario are

- Mortality and morbidity lead to shocks to the labour force.
- Increase in cost by sector leads to additional supply shocks
- Sector-wise demand shocks
- Risk premium shock

Shock to the labour force is based on the country-specific index

- The morbidity rate is assumed that the attack rate in each economy is 30%
- Days of which the employee is sick or not available for work (lockdown or quarantine days)
- Loss due to absenteeism is calculated by

$$\frac{No.\,of\ days\ the\ employee\ not\ available\ for\ work}{Weeks\ in\ year\ \text{X}\ woking\ days\ per\ week}\ \text{X}\ Morbidity\ rate$$

The epidemiological shock is estimated using indicators like epidemiological severity. Various scenarios are created using mortality and morbidity rates derived from the historical data.

Warwick Mckibbin (2020) [9] studied the effect on macro-economy due to COVID-19 outbreak using Lee and Mckibbin (2003) and extended Mckibbin and Sidorenko (2006) [10] model to examine the different scenarios and possible outcomes.

Epidemiological assumptions considered China under seven different scenarios based on totality and mortality rate.

The study states that the labour supply in each county has three components

- Mortality due to infection
- Morbidity due to infection
- Morbidity arising from caregiving for affected family members.

This study considered that the average absenteeism of an employee due to infections is considered 14 days. Each scenario is given a name. S01 is scenario 1.

Table 1: Epidemiological assumption

Scenario	Attack rate	Case fatality rate	Mortality rate
S01	1%	2.0%	0.02%
S02	10%	2.5%	0.25%
S03	30%	3.0%	0.90%
S04	10%	2.0%	0.20%
S05	20%	2.5%	0.50%
S06	30%	3.0%	0.90%
S07	10%	2.0%	0.20%

Table 2: Labour shock to India for different scenario

Scenario	S01	S02	S03	S04	S05	S06	S07
India	0	0	0	1.34	2.82	4.44	1.34

Table 2 clearly shows that when the attack rate and the fatality rate increases the effect on labour also increases.

An interim Norwegian study of Corona epidemic's effect on workers conducted classifying workers into four groups

I. Low education, high income
II. Low education, Low income
III. High education, High income
IV. High education, Low income

Study state that many of the country's workers have become pessimistic about their future since the corona outbreak and those with the lowest level of education and lowest income have been the hardest hit.[7]

[6] United Nations Development Group. (2015). Socio-economic impact of Ebola virus disease in West African countries.

[7] http://www.nordiclabourjournal.org/nyheter/news-2020/article.2020-04-21.2187368376

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IV. Findings

- These reviews indicate that the effect of labour during the epidemic outbreak is vital.
- This study is a tool to understand the areas of further research to increase the preparedness to combat epidemic outbreaks and keep economy form downfall
- The Physical, economical and psychological effects of the epidemic on labours shall be taken into consideration.
- The study indicates the direct and indirect effect of the epidemic on labours in urban and rural economies.
- Study shows that the mortality and morbidity rate increases the labour loss in the country
- Warwick Mckibbin model shall be considered to understand and estimate losses in different scenarios due to epidemic and by considering the mortality and morbidity rate will assist the nation's epidemic preparedness in the future.

V. Conclusion

Epidemics relatively have a negative impact on the economy and human resources. The effects on employment and psychological consequences will have medium and long term consequences. This study can be applied in understanding the epidemic effect on labour loss which will aid in understanding the labour required for a hygienic and safe environment and how the spread of pandemic affects the labours physical, psychologically and economically. The said facts can be considered while forming reforms for the labour and to estimate the effect at different fatality and mortality rates. International labour organization report on 18th March 2020 stated that deeper institutional policy reforms are required which will strengthen the recovery through robust and social protection systems to stabilize the economy after the crisis. Shocks to labour are exogenous which will affect the labour demand for weeks. In today's globalized economy, a long term economic strategy should be formulated considering historical events.

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[14] http://documents.worldbank.org/curated/en/2014/10/20270083/economic-impact-2014-ebola-epidemic-short-medium-term-estimates-west-africa

[15] https://www.aljazeera.com/ajimpact/hungry-desperate-india-virus-controls-trap-migrant-workers-200402031123631.html

[16] https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/646195/EPRS_BRI(2020)646195_EN.pdf

[17] https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_738753.pdf

[18] https://www.theatlantic.com/ideas/archive/2020/04/the-pandemic-exposes-indias-two-worlds/609838/

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