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The Editor, Health and Population: *Perspectives and Issues*,

The National Institute of Health and Family Welfare,

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Effect of Domestic Violence on Health Status and Treatment Seeking Behaviour of Women in North East India

***Kshetrimayum Anand Singh and **Sharat Chandra Haobijam**

* Assistant Professor, E-mail: kshanand_1@yahoo.com; **Research Scholar, haobijamsharatchandra@gmail.com; Department of Statistics, Manipur University, Manipur, India

Abstract

Domestic violence is now widely recognized as an important public health problem, owing to its health consequences. It has negative impact on the demographic outcome of a country or region which includes the health and treatment seeking behaviour of women. In this paper, the authors assess the relationship between domestic violence and health and treatment seeking behaviour of women in North East India using data from the NFHS-4. The impact of the socio-economic risk factors on domestic violence and the impact of domestic violence on health consequences are analyzed. The relationship between domestic violence with women's health status and non-communicable diseases is statistically investigated by way of fitting a logistic regression model. In North-East India, it was seen that 24 per cent of the married women faced domestic violence, of which 5.6 per cent has currently suffering from one or more non-communicable diseases. Among the affected women, 71.9 per cent has asked for treatment.

Key words: *Domestic violence, NFHS, logistic regression, odds ratios.*

Introduction

Domestic violence generally refers to violence against women which generally takes place in the matrimonial homes. The type of violence includes not only physical but also psychological in which the violent behaviour attempts to dominate or gain a complete control over the victim's right to live. Though the main perpetrator in a domestic violence happens to be the husband, all persons including the in-laws and persons intimately or otherwise connected to the women through marriage are often involved in many cases of domestic violence.

United Nation's framework for nodal legislation on domestic violence states that all acts of gender-based-violence: physical, psychological and abuse by a family member against women in the family, ranging from single assault to aggravated physical assaults, kidnapping, threats, intimation, coercion, stalking, humiliating verbal use, forcible or unlawful entry, arson, destruction of property, sexual violence, marital rape, dowry related violence, female genital mutilation, violence related to exploitation through prostitution, violence against household workers and attempts to commit such acts shall be termed domestic violence.

Domestic violence can be termed as the power misused by one adult in a relationship to control another. It is the establishment of control and fear in a relationship through violence and other forms of abuse. This violence can take the form of physical assault, psychological abuse, social abuse, financial abuse, or sexual assault. The frequency of the violence can be on and off, occasional or long-lasting. Domestic violence is the most common form of violence against women. It affects women across the life span from sex selective abortion of female fetuses to forced suicide and abuse, and is evident, to some degree, in every society in the world.

In India, domestic violence was recognized as a human right issue in 1980s due to the increasing number of dowry deaths and crimes against women. After a decade-long process of consultations and revisions, a comprehensive domestic violence law, known as the Protection of Women from Domestic Violence Act 2005, took effect in 2006. Some main features of the law include the prohibition of marital rape and the provision of protection and maintenance orders against husbands and partners who are physically, emotionally, or economically abusive[1].

Background

The ubiquity of domestic violence (DV) can be gauged from the fact that it has been documented in different cultures and societies all over the world. There is growing awareness that DV is a global phenomenon and is a serious issue in developing countries as well. Nevertheless, DV shows particular forms and patterns depending on the local context and recognized as an important public health problem. The prevalence of DV in India ranges from 6 per cent to 60 per cent, with considerable variation across the states in different settings. Various studies from South Asian countries on DV have identified a number of associated individual and household level risk factors which shows that certain demographic factors such as age, number of living male children, and living in extended family have an association with DV[2].

Violence against women is a serious problem in India. Overall, one-third of women age 15-49 have experienced physical violence and about 1 in 10 has experienced sexual violence. In total, 35 percent have experienced physical or sexual violence. This figure translates into millions of women who have suffered, and continue to suffer, at the hands of husbands and other family members[3,4]. Over the past few decades domestic violence has received a significant attention for its role in health and well-being of women, children and families. Self-reporting of domestic violence is not adequate for the developing countries like India, to realize the actual burden of this social problem[5].

India's National Family Health Survey-III, carried out in 29 states during 2005-‘06, has found that a substantial proportion of married women have been physically or sexually abused by their husbands at some time in their lives. The survey indicated that 37.2 per cent of interviewed women experienced violence after marriage. Bihar was found to be the most violent, with the abuse rate against married women being as high as 59 per cent. Strangely, 63 per cent of these incidents were reported from urban families rather than the state's most backward villages. It was followed by Madhya Pradesh (45.8%), Rajasthan (46.3%), Manipur (43.9%), Uttar Pradesh (42.4%), Tamil Nadu (41.9%) and West Bengal (40.3%)[3].

As reported by the National Family Health Survey-4, 27 per cent of women have experienced physical violence since age 15 and 6 per cent have ever experienced sexual violence in their lifetime[6]. Further the same report indicates that 31 per cent of ever married women have experienced physical, sexual or emotional spousal violence. The most common form of spousal violence is physical violence (27%) followed by emotional violence (13%) and sexual violence (6%). It is also reported that there is a decline in

domestic violence ever experienced by ever-married women from NFHS-3 (2005-'06) 37 per cent[3] to NFHS-4 (2015-'16)[6] 29 per cent. Among all the states of India, Manipur is reported to have the highest percentage of domestic violence (55%) and Sikkim is reported to have the least domestic violence (3.5%) as ever experienced by ever-married women in the age group 15-49 years. Both these two states are in the North-eastern region of India.

In the North East of India, women enjoy greater mobility and visibility than women of other communities in the country. Practices such as dowry and bride burning are not very prevalent in the region. But the data collected for violence against women, particularly domestic violence, is on rise in the North East India[6]. To have a better understanding of the potential risk factors necessary to reduce the prevalence of the violence against women this study was planned to assess the magnitude, the forms of violence as well as factors associated with violence against ever married women in North East India. The study also investigates the health and treatment seeking behaviour of women in North East India vis-a-vis domestic violence. Those women who reported at least one non-communicable disease viz. Asthma, diabetes, cancer, hypertension, thyroid and heart disease during the survey are included in the analysis.

Objectives

The present paper aims to investigate

i) the prevalence of domestic violence in eight states of North-East India;
ii) identifying significant socio-economic covariates which influences the domestic violence; and
iii) the impact of domestic violence on health status of women and their treatment seeking behaviour.

Data

The present study uses the data of North-East compiled from the National Family health survey (NFHS-4) conducted during 2015-2016. In NFHS-4, information was obtained from never-married women on their experience of violence committed by anyone and from ever-married women on their experiences of violence committed by their current or former husbands or by others. The North Eastern states of India possessed eight states namely, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. In North-east, out of 98702 women in the age group 15-49 who are interviewed only 8177 women are selected and interviewed for domestic violence module. In Arunachal Pradesh, 1226 women's in the age group 15-49 are selected and interviewed for domestic violence module, 2474 women in Assam, 1067 women in Manipur, 654 women in Meghalaya, 858 women in Mizoram, 817 women in Nagaland, 501 women in Sikkim and 580 women in Tripura.

Methodology

The association between domestic violence and all other covariates (socio-economic and women's health status) which are supposed to be associated with domestic violence is examined using the bivariate analysis which produces chi-square p-values for the significance of the measure of association. Covariates are categorical variables which include residence, women's education, religion, wealth, parity of women, husband's education, women's working status and husband's alcohol use. All covariates which are significant at five per cent ($p < 0.05$) are considered potential covariates in the logistic regression analysis. We employ logistic regression analysis to estimate the probability of experiencing a form of domestic violence committed by husband or partner or others. The probabilities are interpreted in terms of odds ratios (OR) which gives the likelihood of experiencing the event in the different categories of a covariate as

compared to a reference category. The first model is fitted with DV as dependent variable and socio-economic variables as independent variables. Further, a second logistic regression model is fitted by taking health status of women as dependent variable and DV as independent variable. In this model a woman who is selected for DV module is asked for having any of the five non-communicable diseases (diabetes, asthma, thyroid disorder, cancer and heart diseases). A dichotomous dependent variable is constructed by identifying two categories viz. having no disease and having at least one disease. A third model is also fitted by taking all women who reported at least one disease. The dependent variable is the treatment seeking status of all women having at least one disease and independent variable is the experience of DV.

Figure 1
Framework for the Determinants of Domestic Violence and Health Status of Women (Non-Communicable Diseases and Health Seeking For Treatment)

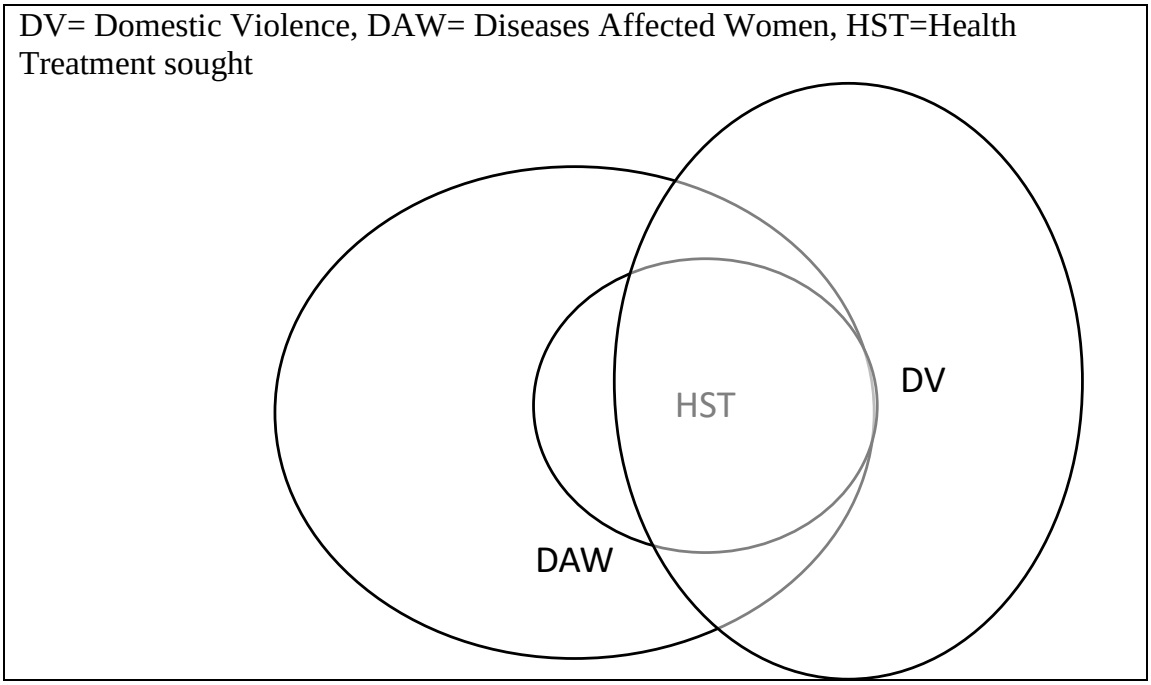

Table 1
State-wise Percentage Distribution of Women Who Reported Domestic Violence

State	No. of women interviewed (%)	No. of Women who experienced (at least once)
		Domestic Violence (%)
Arunachal	1226(15)	326(26.6)
Assam	2474(30.3)	575(23.2)
Manipur	1067(13)	557(51.8)
Meghalaya	654(8)	146(22.3)
Mizoram	858(10.5)	119(13.9)
Nagaland	817(10)	75(9.2)
Sikkim	501(6.1)	8(1.6)
Tripura	580(7.1)	158(27.2)
Overall NE States	N=8177	1964(24)

Findings

The association between health status for women and experience of domestic violence is statistically examined by chi-square test of association with p-values indicated in Table 2. Those p-values which are significant (<0.05) at 5 per cent level indicates that health status of women is associated with experience of domestic violence as reported by them. All health status variables are highly significant.

In Table 3, percentage distribution of women who experienced domestic violence by different categories socio-economic variables is presented along with p-values for test of association between these socio-economic variables and experience of domestic violence. All the selected eight covariates are highly significant indicating that these potential predictors of domestic violence in the region.

All covariates which are significant at five per cent ($p < 0.05$) are considered potential covariates in the logistic regression analysis. The covariates which are found significant includes women and husband's education, religion, place of residence, wealth index, women's working status, parity of women, husband's alcohol use. Experience of domestic violence (DV) is considered as dependent variable in the models Table 4 and Table 5.

Table 2
Association between Health Status and Domestic Violence

Health status	No. of Women (%)	p- value (Chi-square)
At least one non-communicable disease		
No	7715(94.4)	0.00
Yes	462(5.6)	
Affected women seeking health treatment		
No	130(28.1)	0.00
Yes	332(71.9)	
Body mass index (BMI)		
Underweight	1006(12.5)	0.02
Normal	5349(66.3)	
Overweight	1432(17.8)	
Obese	277(3.4)	
Allowed to go to the health facility		
Not allowed	190(2.3)	0.00
Allowed Alone	4573(55.9)	
Allowed with someone	3414(41.8)	

Table 3
Percentage Distribution of Women in Different Categories of Socio-economic Variables

Socio-economic characteristic	Women participants' numbers (%)	P-value
Residence		
Urban	2037(24.9)	0.00
Rural	6140(75.1)	
Women's Education		
Illiterate	1771(21.7)	0.00
Primary	1465(17.9)	
Secondary	4404(53.9)	
Higher	540(6.6)	

Religion Hindu Muslim Christian No religion/Others	 3273(40) 876(10.7) 3175(38.8) 853(10.4)	0.00
Wealth Index Poorest Poorer Middle Richer Richest	 1267(15.5) 2543(31.1) 2138(26.1) 1584(19.4) 645(7.9)	0.00
Parity of women At 0 Upto 2 More than 2	 647(7.9) 4038(49.3) 3496(42.8)	0.00
Husband's Education Illiterate Primary Secondary Higher don't know	 1342(16.4) 1528(18.7) 4404(53.9) 881(10.8) 22(0.3)	0.01
Women's working status No Yes	 6015(73.6) 2162(26.4)	0.00
Husband drinks alcohol No Yes	 4673(57.2) 3499(42.8)	0.00

Table 4
Logistic regression Model 1: DV~ Socio-economic variables

Variables and categories		Coeff. (b)	Odds ratio	p- values
Wealth index	Poorest(ref)	-	-	
	Poorer	-0.26	0.77	0.000
	Middle	-0.63	0.53	0.000
	Richer	-0.82	0.44	0.000
	Richest	-1.27	0.28	0.000
Husband education	Illiterate(ref)	-		
	Primary	-0.19	0.83	0.019
	Secondary	-0.43	0.65	0.000
	Higher	-0.53	0.59	0.000
Women's education	Illiterate(ref)	-		
	Primary	-0.19	0.83	0.011
	Secondary	-0.51	0.60	0.000
	Higher	-0.65	0.52	0.000
Religion	Hindu(ref)	-		
	Muslim	0.06	1.06	0.416
	Christian	-0.20	0.82	0.000
	No religion/Others	0.04	1.04	0.626
Women working status	No(ref)	-		

	Yes	0.51	1.66	0.000
Husband drinks alcohol	No(ref) Yes	- 1.11	 3.05	 0.000
Residence type	Urban(ref) Rural	- 0.25	 1.29	 0.000
Parity of women	0(ref) upto 2 More than 2	- 0.31 0.60	 1.36 1.83	 0.002 0.000

Table 5
Logistic Regression Model 2: DV~ Health Status Variables

Health status variables and categories	Coeff. (b)	Odds ratio	P- values
Currently has diseases			
No (Ref)	-	1.76	0.000
Yes	0.57		
Body mass index (BMI)			
Underweight (ref)	-	0.89	0.12
Normal	-0.12	0.76	0.00
Overweight	-0.27	0.78	0.10
Obese	-0.25		
Allowed to go to the health facility			
Not allowed(ref)	-	0.75	0.07
Alone	-0.29	0.91	0.56
With someone else	-0.09		

Table 6
Logistic Regression Model 3: DV~ Health Seeking Behaviour

Health seeking Behaviour	Coeff.(b)	Odds ratio	P- values
Health treatment sought			
No (ref)	-	1.14	0.52
yes	0.13		

Discussions

In Table 4 the result of fitting the logistic regression model 1 (dependent variable= DV) which include all significant socio-economic covariates as predictors is presented. This includes the regression coefficient, odd ratios (OR) and corresponding p-values. Education of both women and husband significantly influence experience of domestic violence by ever-married women. With higher and higher education there is lesser and lesser incidence of committing domestic violence. Women whose husband are educated upto secondary level have 35 per cent less chance of experiencing domestic violence and as compared to women with illiterate husbands. Similarly, women whose husbands obtained higher education have 41 per cent less chance of experiencing domestic violence and as compared to women with illiterate husbands. Women's educational level also indicates a significant influence and in that higher and higher level of education there is lesser and lesser chance of experiencing domestic violence.

Wealth of the family is also an important covariate to significantly influence domestic violence in a family. Women in the richest wealth quintile have 72 per cent and in the richer quintile have 56 per cent less chance of experiencing domestic violence committed by husband as compared to women in the poorest wealth quintile.

Parity of women which indicates the total number of children born is also an important covariate for domestic violence. Higher the parity the more chance of having all forms of violence. Women at parity 2 are 1.4 times more likely to report domestic violence as compared to women at 0 parity. Again, women at parity more are 1.8 times more likely to report domestic violence as compared to women at 0 parity. Working women have 66 per cent more risk of facing domestic violence as compared to women who do not work. Place of residence is important covariate to influence all forms of domestic violence. Rural women have higher risk of experiencing all forms of domestic violence than urban women. Rural women have 1.3 times more chance to experience domestic violence as compared to urban women.

Religion is not found to be an important covariate to influence domestic violence in North-East India as only one category viz. Christian is significant. Christian women have 18 per cent less risk of having a domestic violence as compared to Hindu women. Husband's drinking status is also important because husbands who drink commit more forms of violence than those who do not drink. Risk is also very high as women whose husbands drink have 3.05 times more likely to face violence as compared to women whose husbands do not drink. All categories in the husband occupation are not significant at five per cent.

Results of fitting logistic regression model 2 is presented in Table 5 where covariates related to health status of women are taken into account to explain experience of domestic violence in the region. Women who have currently at least one of the diseases like diabetes, asthma, thyroid disorder, cancer and heart diseases have 1.76 times more likely to experience domestic violence as compared to women who reported no such diseases. From the Table-5 (model-2), body mass index (BMI) of women's is most important covariate for the health status of women. In the analysis, underweight women have higher chance of facing domestic violence as compared to other BMI categories of women. Percentage of women who were allowed to go to the health facilities is 5 per cent which is not significant. From Table-6 (model-3), among the disease affected women, women who are seeking for health treatment are not significant in terms of experiencing domestic violence.

Conclusion and Recommendations

In the whole country and in the North-east states, Manipur has topped the list in experiencing domestic violence with 51.8% and Sikkim reported the least with 1.9 per cent. Rural women have higher risk of experiencing all forms of domestic violence than urban women. Education of both woman and husband as a potential covariate to influence domestic violence indicates that with higher education there is less chance of experiencing all forms of domestic violence. Women, whose husbands drink, are 3.05 times more likely to face domestic violence as compared to women whose husbands do not drink. In North-East India, 24 per cent of women faced domestic violence, of which 5.6 per cent of women has currently one of the diseases i.e., diabetes, asthma, thyroid disorder, cancer and heart diseases. Among the disease affected women, 71.9 per cent of women have asked for treatment. Disease affected women has 76 per cent more chance of facing DV than those women who are affected. In BMI, overweight women have 24 per cent less chance of facing domestic violence as compared to underweight women.

All forms of domestic violence have serious consequences on women's health. Many studies are of the view that violence by intimate partner most likely undermines the sexual and reproductive health of the women. The North-east region of India reports the most and the least cases of domestic violence experienced by women. With the above findings we hope that the present study will help the policy and programme planners to improve activities to reduce domestic violence in the region. Some recommendations from the findings of the present study are to improve the educational levels of both husband and wife and this will also result to improve the responsible drinking habit of husbands in the region. In order to achieve more treatment seeking behaviour of women we need more social support to the affected women.

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Migration in Haryana: Inflows, Outflows and Reasons

***Rahul**

*Research Scholar, International Institute for Population Sciences, Mumbai-400088. E-mail: rahuliips96@gmail.com.

Abstract

In recent times, migration from one place to another has emerged as an important component of population composition and change. Analysis of migration pattern is important to understand the changes taking place in the people's movement within the country. This study attempts to study both inflow and outflow from the state Haryana and covers both internal and international migration. This paper uses data from Census 2011 and has tried to study the magnitude of inflows to the state as well as the outflows from the state at the state level and also reasons for migration. Despite the huge in-migration in the states, out-migration from the agriculturally developed state has also emerged as an important phenomenon. Census 2011 recorded 10.42 million migrants in the state, which constitute about 41 per cent of the total population of the state. This shows an increase of about 4.45 million migrants from census 2001. Uttar Pradesh, Rajasthan, NCT of Delhi and Punjab states are sending 70 per cent of total interstate migrants to the state and receiving more than 85 per cent of interstate out-migrants from the state. More than 81 per cent of international migrants to the state have originated from Pakistan and Nepal. This paper throws light on the combined impact of internal and international migration in the Haryana state which is generally lacking behind in migration studies on Haryana relevant for economic policy.

Key words: *Migration, Reasons, Immigrants, Inflows, Outflows, Rate of migration*.

Introduction

Prior to the advent of the green-revolution agriculture sector was marked by subsistence agriculture, low productivity, and poor agricultural infrastructure but after the green revolution state experienced advancement in its agriculture[1]. More than 80 per cent of the population of the state is, directly or indirectly, connected with agriculture[2]. Total population of Haryana is 2.53 crore which accounts for 2 per cent of the total population of India (Census 2011). Government of Haryana's economic survey report (2019) shows that the share of Agriculture and Allied Sectors in GSDP declined from 60.7 per cent in 1969-70 to 21.3 per cent in 2006-07 while the share of Industry Sector increased from 17.6 per cent in 1969-70 to 32.1 per cent in 2006-07 and the share of Services Sector increased from 21.7 per cent to 46.6 per cent during this period[3]. Analysis of migration patterns is important to understand the changes taking place in the people's movement within the country[4]. Migrants bring new ideas, skills, and a host of cultural practices related to food, dance and music, etc[5]. With improved education and the rapidly changing Indian economy, transportation with communication facilities, along with changing workforce has accelerated mobility across India[6]. Article 19 of the Indian Constitution gives the guarantee of freedom of movement and freedom to settle to the people within India as their fundamental right[7]. Interstate migrants are generally considered to be better off in terms of their socio-economic profile as they work largely in non-agricultural sectors and

have a higher incidence of regular employment, compared to those moving within a state or a district[8]. Gujarat, Haryana, and Madhya Pradesh are top 5 destinations states to which people migrate and Haryana ranks 3rd after Uttar Pradesh and Bihar for sending migrants[9].

Methodology

Internal migration involves a change of residence within national borders. Until 1951, the district was the migration defining area (MDA), implying that a person was considered a migrant in India only if he or she has changed residence from the district of birth to another district or a state. Since 1961, data on migration have been collected by considering each revenue village or urban settlement as a separate unit. A person is considered a migrant if the birthplace is different from the place of enumeration. In the 1971 census, an additional question on the place of last residence was introduced to collect migration data. Since then, the census provides data on migrants based on place of birth (POB) and place of last residence (POLR). If the place of birth or place of last residence is different from the place of enumeration, a person is defined as a migrant. Inflow to Haryana represents the in-migration to the defined state and outflow stands for out-migration from the state to various other states of India. In addition, immigration to Haryana has been also studied.

Findings

Migration in Haryana

Table 1 presents the magnitude of migration in the Haryana state based on the definition of place of birth and place of last residence. There is not much difference in migration based on the two definitions. In the country about 450 million people, constituting 37 per cent of the population are migrants. It is observed that there is more mobility in the state as compared to the country average. More than 40 per cent of the people in the state are migrants as compared to about 37 per cent country average. The lowest mobility is observed in the district of Bhiwani, where just about one-fourth are migrants.

Table 1
Migration Intensity in Haryana by Place of Birth and Place of Last Residence, 2011

Districts	Place of last residence		Place of birth	
	Total migration (000s)	% to population	Total migration (000s)	% to population
Ambala	485	34.0	476	33.7
Bhiwani	555	24.2	551	24.0
Faridabad	1064	40.1	1046	39.7
Fatehabad	371	39.1	363	38.4
Gurgaon	859	36.5	846	36.1
Hisar	664	36.2	657	36.0
Jhajjar	364	60.6	361	59.3
Jind	486	36.5	481	36.0
Kaithal	392	56.8	386	55.9
Karnal	588	38.1	578	37.7
Kurukshetra	411	39.4	402	38.6

Mahendragarh	333	45.2	331	44.7
Mewat	263	43.3	261	42.5
Palwal	324	40.1	321	39.5
Panchkula	340	43.1	332	42.2
Panipat	544	38.0	538	37.7
Rewari	357	39.7	354	39.3
Rohtak	386	31.2	382	30.8
Sirsa	560	42.7	549	41.8
Sonipat	581	36.5	574	36.1
Yamunanagar	486	58.8	479	57.8
Haryana	10423	41.1	10281	40.6
India	455,409	37.6	446,997	36.9

Source: Table D-1 and D-2, Census of India 2011

Table 2 shows the streams of migration in the state of Haryana based on the definition of place of last residence. It is seen that interstate migration dominates among all the streams in the state. About 35 per cent of migrants in the state have moved from the other states of India. Among the district of Haryana, Jind has less than one-tenth (7.6%) of migrants moved from the other states of the country. In the districts of Faridabad (65.7%), Gurgaon (59.4%), Panchkula (52.1%) and Sirsa (55.3%), more than two-fourth of the migrants have moved from the other states of India. International migration to the state constitutes about 1.5 per cent of the total migrants in the state. The share of international migrants in the district of Ambala is 3.4 per cent of total migrants, the highest among all districts.

Table 2
Distribution of Migrants by Streams of Migration Based on Place of Last Residence, 2011 (in %)

Districts	Intradistrict	Interdistrict	Interstate	Immigrants	Total
Ambala	18.3	33.0	45.3	3.4	100.0
Bhiwani	38.1	41.8	19.3	0.8	100.0
Faridabad	18.7	13.9	65.7	1.7	100.0
Fatehabad	32.7	37.1	28.5	1.7	100.0
Gurgaon	17.5	21.3	59.4	1.9	100.0
Hisar	37.0	43.0	18.5	1.5	100.0
Jhajjar	38.9	39.4	21.2	0.5	100.0
Jind	45.4	46.4	7.6	0.7	100.0
Kaithal	44.7	39.2	14.8	1.3	100.0
Karnal	23.8	44.2	28.8	3.2	100.0
Kurukshetra	43.2	35.5	19.5	1.8	100.0
Mahendragarh	59.0	16.7	24.0	0.2	100.0
Mewat	67.0	12.9	19.9	0.2	100.0
Palwal	36.5	25.0	37.9	0.6	100.0
Panchkula	30.4	16.2	52.1	1.3	100.0
Panipat	25.4	35.1	37.7	1.8	100.0
Rewari	30.0	34.0	35.3	0.7	100.0
Rohtak	32.0	51.1	14.9	2.0	100.0

Sirsa	26.8	15.8	55.3	2.1	100.0
Sonipat	43.8	30.1	25.1	1.1	100.0
Yamunanagar	28.7	28.1	40.5	2.7	100.0
Haryana	33.8	30.4	34.3	1.5	100.0
India	60.9	25.9	11.9	1.2	100.0

Source: Table D-2, Census of India 2011

Table 3 gives the sex-wise distribution of migrants in the state of Haryana by the streams of migration. The sex ratio is calculated as the number of female migrants per 1000 male migrants. The national figure shows the feminization of migration irrespective of streams of migration. There are 2121 female migrants for every 1000 male migrants in the country, with the greater dominance in migration within the state of enumeration. Compared to the country average, there is more dominance of female migration in the state. The dominance of female migrants in the district of Mewat, Rewari, Bhiwani and Palwal pulled up the state's migrant sex ratio to 1185. It is observed that male migrants dominate the flow of international migration from the countries outside India. The sex ratio of interdistrict migration is 4507 female migrants per 1000 male migrants, with the highest in 10909 in Mewat and the lowest 1691 in Panchkula. There is not a single district in the state which has more male migrants than female migrants showing the feminization of migration in the state of Haryana.

Table 3
Sex Ratio (Female/Male) of Migrants, Place of Last Residence, 2011

Districts	Population	Intra-district	Inter-district	Interstate	Immigrants	Total
Ambala	885	1559	4236	1925	977	2093
Bhiwani	886	4029	8278	4514	1370	4992
Faridabad	873	906	1874	1063	941	1095
Fatehabad	902	2261	3769	2158	991	2622
Gurgaon	854	1612	2379	1022	857	1298
Hisar	872	2423	4574	1801	1123	2825
Jhajjar	862	2591	6593	1861	938	3303
Jind	871	2326	6859	1972	1031	3625
Kaithal	881	2357	8693	2664	936	3687
Karnal	887	2131	5163	1640	901	2548
Kurukshetra	888	2186	3532	1525	783	2353
Mahendragarh	895	3673	8790	7800	1543	5568
Mewat	907	6173	10909	7627	2390	7242
Palwal	880	2916	8979	4456	1581	4212
Panchkula	873	1408	1691	1157	876	1285
Panipat	864	1375	3406	1117	967	1661
Rewari	898	3092	6398	2484	1373	3473
Rohtak	867	1962	4673	1877	1060	2896
Sirsa	897	2000	2623	2346	937	2193
Sonipat	856	1817	6470	1778	1061	2462
Yamunanagar	877	2691	4005	1405	916	2218
Haryana	879	2146	4507	1605	970	2313
India	943	2346	2244	1273	1185	2110

Source: Table D-2, Census of India 2011

Interstate Inflows and Outflows into and from Haryana

Table 4 shows the percentage distribution of migration to different district of the state from various states of the country and total outflow from the state as a whole. The contribution of migration from each state of the country has also been given for comparison. More than 93 per cent of the migrants in the state of Haryana have originated from the states of Uttar Pradesh, Rajasthan, Punjab, NCT of Delhi and Bihar. More than 95 per cent of the in-migrants belong to only 10 states/UTs of the country. In the district of Palwal (70.8%), Panipat (56.6%), Yamunanagar (50%), Faridabad (44.2%), Karnal (39%) and Sonipat (40.2%) have received the highest number of migrants from the Uttar Pradesh. more than one-third of the migrants in Jhajjar and nearly one-third in Rohtak have migrated from the capital of the country-Delhi. Out-migrants constitutes about 9 per cent of the state's population. More than three-fourth of out-migration have moved to only three nearby states, these are Delhi, Punjab and Rajasthan. The study also shows that people moved to the state of Punjab and Rajasthan mainly for marriage while to the state of Delhi due to work as a reason for migration.

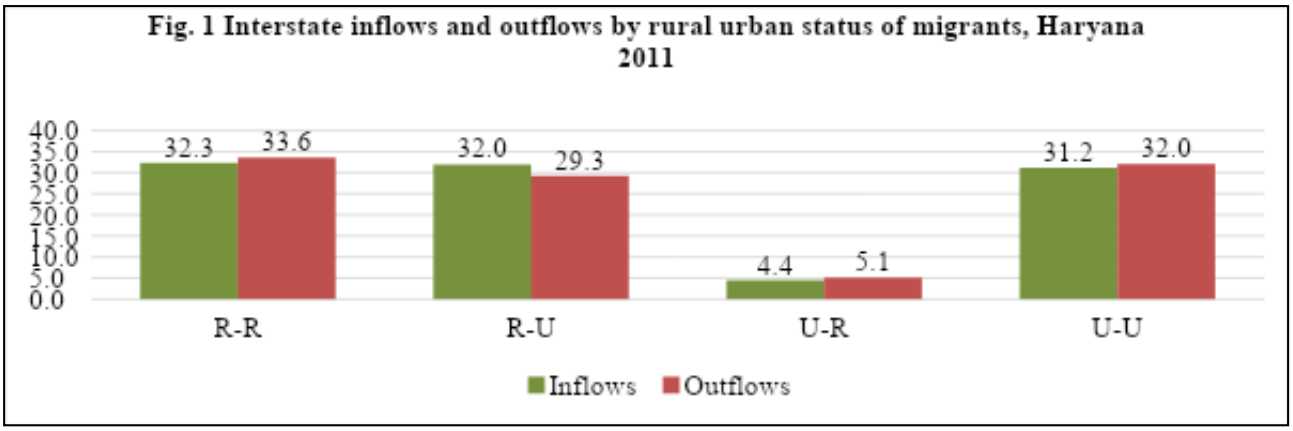
Table 4
Distribution of Interstate Migrants to Haryana by Place of Last Residence, 2011 (in %)

Districts	Migrants' Origin states											
	UP	RJ	Punjab	Delhi	Bihar	UK	WB	CH	HP	MP	Others	Total
Ambala	23.8	2.3	42.5	4.4	6.2	3.5	1.4	3.9	4.4	1.5	6.0	100.0
Bhiwani	14.2	65.0	3.5	5.9	3.2	0.8	1.2	0.3	0.3	1.9	3.8	100.0
Faridabad	44.2	5.4	3.3	19.4	16.0	3.2	1.7	0.3	0.8	1.5	4.2	100.0
Fatehabad	9.4	22.5	59.2	1.4	3.2	0.4	0.5	0.3	1.2	0.9	1.1	100.0
Gurgaon	25.4	9.9	2.5	27.5	13.2	2.1	5.7	0.5	0.7	2.8	9.6	100.0
Hisar	21.2	37.7	12.5	4.5	10.2	2.1	1.8	0.5	0.9	2.2	6.4	100.0
Jhajjar	24.1	9.5	2.2	40.7	12.0	1.3	2.4	0.1	0.3	2.3	5.0	100.0
Jind	25.5	7.4	31.0	9.9	14.0	1.7	2.0	1.1	0.9	1.7	4.8	100.0
Kaithal	18.2	3.2	58.7	3.2	9.8	1.1	0.9	1.1	1.0	0.8	2.0	100.0
Karnal	39.0	2.8	17.2	7.4	23.1	2.7	1.1	1.3	1.5	1.0	2.9	100.0
Kurukshetra	27.8	2.4	39.0	4.8	14.0	2.9	0.8	2.4	1.9	0.8	3.3	100.0
Mahendragarh	3.6	87.6	0.8	2.6	0.5	0.2	1.0	0.1	0.1	1.5	1.9	100.0
Mewat	20.5	64.0	0.3	3.9	3.6	0.1	2.5	0.0	0.1	0.6	4.4	100.0
Palwal	70.8	15.6	0.6	6.5	1.8	0.3	1.5	0.0	0.1	1.1	1.8	100.0
Panchkula	21.9	1.8	23.1	3.4	5.3	2.7	0.9	23.8	11.1	0.9	5.1	100.0
Panipat	56.6	2.6	5.8	7.6	18.6	1.4	2.2	0.4	0.6	1.0	3.1	100.0
Rewari	16.2	58.9	1.4	7.0	6.8	1.0	2.0	0.1	0.3	3.1	3.2	100.0
Rohtak	31.0	6.9	7.6	31.2	10.4	2.4	1.9	0.9	0.7	1.9	5.0	100.0
Sirsa	5.9	40.7	47.9	0.8	2.4	0.3	0.3	0.1	0.4	0.4	0.9	100.0
Sonipat	40.2	2.2	2.8	29.2	14.4	1.9	2.0	0.3	0.6	2.4	4.0	100.0
Yamunanagar	50.0	1.3	17.4	3.3	10.8	5.6	2.0	1.4	4.8	0.5	2.7	100.0
Total inflows	**30.7**	**16.9**	**14.8**	**12.9**	**10.8**	**2.1**	**2.1**	**2.0**	**1.7**	**1.6**	**4.5**	**100.0**
Total outflows	**10.0**	**23.1**	**23.6**	**28.8**	**0.2**	**1.5**	**0.5**	**4.0**	**1.5**	**0.8**	**6.1**	**100.0**

Source: Table D-2, Census of India 2011

Note*: UP=Uttar Pradesh, RJ=Rajasthan, UK=Uttarakhand, WB=West Bengal, CH=Chandigarh, HP=Himachal Pradesh and MP=Madhya Pradesh.*

The percentage distribution of rural-urban status of interstate migration inflow to and outflow from the state of Haryana is given in Figure 1. Nearly 64 per cent of interstate migration in the state has originated from the rural areas, as compared to about 35 per cent from urban areas whereas about 62 per cent of interstate migration from the state has moved from the rural areas, as compared to about 38 per cent from urban areas. Further, only 4.4 per cent of interstate migration to the state has been contributed by urban to urban (u-u) migration. Rural to rural (r-r) migration has been observed to be the dominating stream of migration. Urban to rural migration has been observed to be the least followed stream of migration.



Source: Table D-3, Census of India 2011

Table 5 shows the percentage distribution of the reasons for migration to and from Haryana. In the table, only migration from other states, to other states and from countries has been taken into account. The country average indicated the reasons for migration among interstate and international migrants. The state average shows marriage as the most important reason for the migration, followed by moved with household and work. Education and Business are the reasons which are very less reported by migrants, where about 1.2 per cent of the total migration contributed by both the reasons. More than half of the total migration from the states of Punjab (51.0%), Rajasthan (63.5%) and Tripura (66.8%) have originated for the marriage. More than 40 percent of migrants from Bihar, Chhattisgarh and Daman & Diu have moved for work, as compared to just 14.6 per cent of international migrants stating work as a reason for migration. More than one-third of the International migrants have moved with family (36.6%) and others (33.6%) reasons. To better understand out-migration from the economically developed state Haryana, it is necessary to study the different reasons for out-migration from the state. Table 5 shows that marriage, moved with Household, and work have emerged as the important reasons for out-migrating from Haryana to other states of the country. Nearly half of out-migrants from the state have moved due to marriages and above one-fifth with household.

Table 5
Reasons for Interstate Inflows and Outflows to and from Haryana, 2011 (in %)

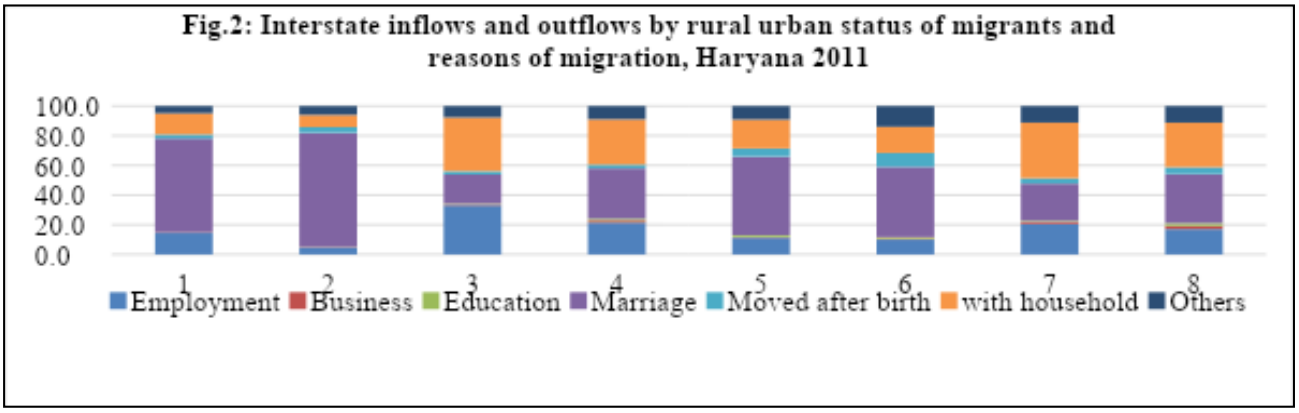
States	Reasons															
	Work		Business		Education		Marriage		Moved after Birth		Moved with Household		Others		Total	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out

Delhi	13.2	19.9	1.0	1.4	0.7	1.1	37.5	35.6	2.7	2.0	32.9	30.4	11.9	9.6	100.0	100.0
Punjab	11.4	9.2	0.7	0.6	0.4	0.5	51.0	52.0	6.9	8.6	19.6	16.0	10.0	13.1	100.0	100.0
RJ	10.6	6.7	0.3	0.3	0.4	0.8	63.5	69.9	2.9	2.9	14.4	12.2	7.8	7.2	100.0	100.0
UP	27.1	8.8	0.5	1.0	0.6	0.6	29.4	61.8	1.8	0.8	31.1	16.1	9.4	10.9	100.0	100.0
CH	13.3	24.8	1.1	1.9	0.5	3.7	16.7	21.4	8.7	7.0	41.7	30.4	18.1	10.8	100.0	100.0
MH	22.9	25.8	0.9	2.4	0.9	2.6	18.0	14.0	2.9	5.1	43.1	33.3	11.2	16.7	100.0	100.0
HP	18.2	14.4	0.6	1.5	1.1	1.8	39.5	44.7	3.7	4.8	26.3	21	10.6	11.8	100.0	100.0
UK	27.2	16.7	0.6	1.2	1.0	3.3	25.1	33.4	2.3	1.5	33.7	31.2	10.1	12.7	100.0	100.0
GJ	22.7	19.6	1.0	8.2	1.1	0.9	15.1	11.8	2.8	3.7	45.1	38.3	12.2	17.5	100.0	100.0
MP	33.3	21.2	0.5	1.6	0.6	1.7	13.3	17.4	1.8	2.9	40.5	41.5	10.0	13.7	100.0	100.0
Others	38.0	20.0	0.5	6.1	0.7	3.0	12.1	14.4	2.0	3.2	36.9	34.0	9.8	19.3	100.0	100.0
Total	21.3	13.4	0.6	1.2	0.6	1.1	35.1	47.9	3.0	4.0	28.6	21.6	10.9	10.8	100.0	100.0
India	23.1	NA	1.6	NA	1.4	NA	31.1	NA	4.6	NA	24.1	NA	14.1	NA	100.0	NA

Source: Table D-3, Census of India 2011

Note: RJ=Rajasthan, UP=Uttar Pradesh, CH=Chandigarh, MH=Maharashtra, UK=Uttarakhand, MP=Madhya Pradesh, HP=Himachal Pradesh, GJ=Gujarat, NA=Not Available

The percentage distribution of rural-urban status of interstate migration inflows and outflows by reasons for migration to the state is given in Figure 2. It is observed that more than 60 per cent interstate inflow from the rural area to the rural area has originated for the marriage, as compared to about 19 per cent from urban to rural areas as a reason for migration and more than three-fourth of outflow from rural areas to rural areas have moved for the marriage as a reason for migration. More than one-third of the inflow from the rural area to the urban area has moved due to work/employment, as compared to only about 14 per cent moved from rural to rural.



Source: Table D-3, Census of India 2011

Table 6 provides the out-migration to in-migration ratio for Haryana. The ratio has been calculated as the number of outflows divided by inflows. A value of one signifies a balance between out-migration and in-migration. A value lesser than one would indicate the net-migration to a state. The ratio of total inflows has added international migration to interstate flows in the computation. It is observed from the table that there are 13 states showing a value of ratio more than one which indicates more number of migrants from the Haryana than migrants to the Haryana. More than one value of ratio has been calculated for the states of Punjab, Delhi, Chandigarh, Maharashtra, Chhattisgarh, Gujarat, Karnataka, Goa, Meghalaya Arunachal Pradesh, Sikkim, Andaman and Nicobar Islands and Dadra and Nagar Haveli.

Table 6
Outflows, Inflows and Outflow to Inflows Ratio for Haryana, 2011

States	Outflows	Inflows	Outflows to inflow ratio
Uttar Pradesh	230,740	1,113,535	0.21
Rajasthan	533,963	611,160	0.87
Punjab	545,584	538,328	1.01
NCT of Delhi	666,331	468,298	1.42
Bihar	3,902	390,937	0.01
Uttarakhand	33,899	77,179	0.44
West Bengal	11,259	75,893	0.15
Chandigarh	93,037	71,890	1.29
Himachal Pradesh	35,750	60,586	0.59
Madhya Pradesh	19,224	56,240	0.34
Maharashtra	48,673	30,907	1.57
Jharkhand	3,729	20,853	0.18
Jammu & Kashmir	5,987	17,700	0.34
Odisha	5,206	16,280	0.32
Assam	3,225	14,088	0.23
Chhattisgarh	12,807	11,813	1.08
Gujarat	32,206	11,250	2.86
Andhra Pradesh	6,220	10,386	0.60
Kerala	2,228	8,302	0.27
Karnataka	12,511	8,084	1.55
Tamil Nadu	5,172	7,724	0.67
Tripura	116	1,204	0.10
Manipur	110	601	0.18
Goa	953	571	1.67
Nagaland	442	487	0.91
Meghalaya	494	481	1.03
Arunachal Pradesh	527	387	1.36
Sikkim	661	325	2.03
Puducherry	130	233	0.56
Lakshadweep	5	230	0.02
A & N	278	199	1.40
Mizoram	83	115	0.72
Daman & Diu	159	32	4.97
Dadra & Nagar Haveli	304	20	15.20
Total	2,315,915	3,626,318	0.64

Source: Table D-2, Census of India 2011. Note: A & N = Andaman and Nicobar Islands

Immigration in Haryana

Studies on international migration have gained more importance lately with the improvement in trade and infrastructure[10]. By the late sixties, the region had started feeling the impulses of development. Major

regions were the areas along the Grand Trunk Road recorded considerable economic, especially industrial development and the areas around Delhi experienced industrial expansion[2].

Table 7 gives the distribution and magnitude of international migration in Haryana based on the place of last residence. The number of international migrants declined to 160 million in 2011 from about 204 thousand in 2001. There has been about a 27 per cent decline in the inflow of international migrants in the state in 2011 as compared to 2001. More than one-fourth of the international migrants in the state have migrated to the districts of Faridabad, Gurgaon and Ambala. Migration from Pakistan constitutes more than two-fourth of the migration. About one-half in Panchkula and more than one-fourth in the Gurgaon district international migration have originated from Nepal.

Table 7
Distribution of Immigrants by Place of Last Residence (in %)

Districts	Pakistan	Nepal	Elsewhere in Asia	Africa	America	Europe + Oceania	Total (000 s)
Ambala	84.3	7.5	3.0	0.8	3.0	1.4	13
Bhiwani	51.3	17.2	4.8	2.9	21.3	2.6	3
Faridabad	61.7	15.1	7.4	2.3	7.4	6.1	16
Fatehabad	82.0	5.5	2.1	1.0	6.5	2.8	6
Gurgaon	31.2	29.0	13.3	3.7	13.9	8.9	16
Hisar	68.2	11.8	1.6	1.5	14.8	2.1	9
Jhajjar	37.9	24.1	14.1	3.5	17.0	3.4	1
Jind	55.9	19.7	3.4	1.9	17.1	2.0	3
Kaithal	83.0	5.3	2.1	0.5	7.6	1.4	5
Karnal	81.6	10.5	1.9	0.5	4.1	1.3	15
Kurukshetra	72.8	15.1	4.1	0.8	4.1	3.2	9
Mahendragarh	24.9	20.7	20.3	5.5	23.6	5.1	1
Mewat	30.5	6.6	24.3	7.8	21.6	9.2	1
Palwal	68.6	4.1	6.7	4.8	11.2	4.6	1
Panchkula	30.0	48.2	7.1	3.4	6.4	4.8	5
Panipat	75.0	16.7	1.2	1.1	4.4	1.6	9
Rewari	47.1	21.1	7.5	4.8	10.5	9.0	2
Rohtak	81.4	10.2	0.7	1.2	5.1	1.4	8
Sirsa	85.3	3.6	1.2	1.3	7.5	1.0	9
Sonipat	70.1	16.4	1.9	1.9	7.5	2.2	6
Yamunanagar	79.0	11.9	3.8	0.6	3.5	1.2	11
Haryana	67.5	14.8	4.7	1.8	7.9	3.3	160

Source: Computed from Table D-2, Census of India 2011

Table 8 shows the reasons for immigrants in the state. Moved with household (36.6%) emerged as the most important reason for migrating to the state followed by 'others' reason (33.6%). About 14 per cent of the migrants have moved for work reasons, while around only 1 per cent have moved for education and business together. Migration for work has been recorded highest in the district of Panchkula (32%) and lowest in Palwal (4%).

Table 8
Reasons for Migration among Immigrants in Haryana (in %)

Districts	Work	Business	Education	Marriage	Moved after birth	Moved with household	Others
Ambala	9.4	0.8	0.1	12.9	1.2	39.1	36.4
Bhiwani	11.9	0.3	0.1	26.9	1.5	28.1	31.2
Faridabad	17.3	1.1	0.2	9.5	2.4	35.0	34.5
Fatehabad	10.0	0.4	0.0	14.8	1.2	38.4	35.2
Gurgaon	28.1	1.1	0.5	6.4	1.2	40.8	21.9
Hisar	11.2	0.7	0.3	16.9	1.2	32.0	37.7
Jhajjar	29.2	0.5	0.4	21.9	1.6	21.7	24.7
Jind	17.0	0.2	0.2	19.3	0.9	29.2	33.1
Kaithal	8.5	0.4	0.1	14.8	0.8	35.6	39.8
Karnal	10.3	0.6	0.2	10.5	1.0	38.1	39.3
Kurukshetra	13.4	0.5	1.5	12.2	1.6	38.2	32.7
Mahendragarh	14.4	0.3	0.9	41.5	4.2	16.4	22.4
Mewat	4.7	0.4	0.0	50.8	0.3	17.1	26.7
Palwal	4.2	0.2	0.2	26.8	0.8	27.8	40.0
Panchkula	32.1	0.7	0.4	10.2	2.6	34.7	19.3
Panipat	13.9	0.9	0.1	8.4	1.0	34.8	41.0
Rewari	16.7	0.1	0.3	23.9	1.2	31.0	26.8
Rohtak	9.2	0.5	0.2	10.3	0.6	42.2	36.9
Sirsa	9.8	0.4	0.1	12.5	1.6	39.4	36.1
Sonipat	15.1	0.5	0.2	14.8	0.9	32.5	35.9
Yamunanagar	12.3	0.5	0.1	12.5	1.0	41.9	31.6
Haryana	14.6	0.7	0.3	12.9	1.3	36.6	33.6

Source: Computed from Table D-3, Census of India 2011

Discussion and Conclusion

In recent times, the phenomena of migration have emerged as an important component of population composition and change. Migration has influenced every aspect of life in the origin as well as the designation. The impact of migration has been felt in the state of Haryana as 2.23 million people from the state have gone to the other states of the country.

The present study analyzed migration intensity in Haryana using data from Census 2011. The national average, wherever possible, has been provided for comparison. Except for intradistrict migration, there is a high mobility in the state of Haryana as compared to the country. The lowest interstate mobility within the state is observed in the district of Jind. While interstate migration dominates migration in the state, districts like Mahendragarh and Mewat have a significant intradistrict migration as well. Female migration dominates migration in the country as well as all the districts in the state. Intradistrict migration in the district of Faridabad has been dominated by male than female migration.

Interstate migration into the state mainly has originated from the neighboring states of Haryana. Furthermore, more than 93 per cent of interstate in-migrants have originated from the states of Uttar Pradesh, Rajasthan, Punjab, NCT of Delhi and Bihar. It is seen that the majority of international migration in the state of Haryana have migrated from Pakistan and Nepal which are neighboring countries.

Marriage is the most important reason for migration in the country as well as in the state. Moved with family and work has been found other important reason of migration the state after marriage. Census 2011 recorded about 2.23 million out-migrants from economically developed state. Out-migrants constituents about 9% of the population of Haryana. More than three-fourth of the interstate outmigration have moved to only neighboring states namely NCT of Delhi, Punjab and Rajasthan. Moved with household, work and 'others' have emerged as the important reasons for out-migrating from the state. Faridabad, Gurgaon, Sirsa and Panchkula are the most preferred districts of the state by the migrants moved from outside the state. While the district of Jind has been the least preferred district in the state by interstate in-migrants.

Rural to rural (r-r) stream has been the important streams among interstate in-migration as well as out-migration. After rural to rural stream, rural to urban migration has been the most preferred stream of migration. There has been a decline in the inflow of immigrants to Haryana in 2011 as compared to 2011. The majority of immigrants have moved to the district of Faridabad and Gurgaon. Among immigrants, moved with household emerged as the most important reason for migrating to Haryana followed by 'others' reason. About 15 per cent of immigrants also have moved to the state for work reason.

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A Critical Appraisal of Impact of COVID-19 on Elderly in India

***Vishal**

*Research Scholar, CRRID, Sector-19, Chandigarh-160019; E-mail: vishalsinghmor@yahoo.com.

Abstract

Elderly are more likely to have awful consequences from COVID-19 virus. It can be a task to avoid elder people from being visible to COVID-19 since they might be completely dependent on others. Covid-19 has hit the whole world badly and India is severely affected too. It is eating up India's labour force. The outcomes about the age-wise break-up of losses due to the Covid-19 disease in India are consistent with what scientists have witnessed about the world-wide developments of the disease and it is found that this virus is disproportionally deadly for those who are aged and above 60 years. This paper will highlight the risk of elderly being more vulnerable to the Covid-19, prior health conditions, impact of Covid-19 on India and its elderly, comorbidities, elderly and impact of covid-19, suggesting some policy recommendations and conclusion.

Key words: *COVID-19; Elderly; Elderly and Covid-19; Comorbidities; Covid-19 and India.*

Introduction

Coronavirus is a unique pathogens that mainly aims the respiratory system of humans. Earlier epidemics of coronaviruses comprise the Middle East Respiratory Syndrome (MERS)-CoV, the Severe Acute Respiratory Syndrome (SARS) – Corona Viruses (CoV), which have been formerly considered as proxies to countless threat to public health. In the last days of December 2019, a group of patients was acknowledged and admitted to hospices with a preliminary identification of pneumonia of an unknown aetiology. These patients were epidemiologically (Epidemiology: branch of medicine which deals with the incidence, distribution, and control of diseases) connected to a seafood and wet animal wholesale market of Wuhan, Hubei Province, China[1,2]. Novel (New) Coronavirus 2019 was named as COVID-19 by WHO on 11 February 2020.

The dissemination of coronavirus (COVID-19) is fast, and experts are trying to evolve drugs for its effective treatment in the whole world[3]. Covid-19 is a contagious disease; generally, diseased people will encounter with mild to moderate respiratory infection, headache, sore throat, high fever, muscle pain, nasal blocking and malaise[4]. Elderly people, suffering from health related complications like cardiac ailment, prolonged lung illness, diabetes and cancer are more likely to cultivate austere sickness[5,6]. Presently, there are no definite vaccines or drugs for Covid-19[7]. Studies propose that quarantining the infected is the finest way to control this endemic[4]. Therefore, countries are competing to moderate the spread of the virus by treating and testing individuals, restraining travel, carrying out contact tracing, isolating citizens, and terminating large public or personal congregations such as political rallies and discussions, religious gatherings, sporting events, shows, and schools, colleges and universities[8].

Indications at mild stage are mostly sore throat, dry cough, malaise, fever and fatigue. Though, in severe circumstances, pneumonia can cause Acute Respiratory Distress Syndrome (ARDS) and multi-organ catastrophe, ultimately leading to death. The death rate is around 2-3 per cent which is considerably lesser compared to its previous congeners like Severe Acute Respiratory Syndrome (SARS). COVID-19 is more infectious. The fatality and severity of COVID-19 has been unswervingly associated to age and immunity, as 15 percent of the initial deaths in China due to COVID-19 were elderly of 60 years or above. As per Chinese Centre for Disease Control and Prevention, the death rate in 60-69 years age group is 3.6 per cent which can stretch up to 18 per cent at 80 years and above. World Health Organization (WHO) in its guidelines has suggested severe social isolation in the elderly population to limit the deaths in seriously pretentious nations. With rise in susceptibility, seniors and their families are in distress, panic and uncertainty.

Elderly: At-Risk Population

Getting old originates with innumerable vulnerabilities to psychological, social, and environmental set up. Weakness in elderly fetches in the danger of several contagions and reduction in all types of immune systems. Elderly are more likely to have awful consequences from this virus. It can be a task to avoid elder people from being visible to COVID-19 since they might be completely dependent on others. For instance, a father might count on her adult son or daughter to help him with routine and odd jobs. Similarly, an elderly might depend on his family member or friend for driving him to grocery store or healthcare facility. But now, individuals could not have somebody to visit their houses to help with those types of work for several days or weeks. We too, have to consider all of the ways that this epidemic disturbs elder people's lives beyond morbidity and death from the virus itself. The matter of concern is about the individuals undergoing social seclusion as a consequence of not being able to have visitors and not being able to go out and do things with other people. The consequences are compounded for any elder individual who doesn't have access to social media platforms like video calling, Facebook, Instagram or who has restricted access to voice calls. Many lower-income older people have pay-per-minute phone plans, for example, and may have to choose between using their limited minutes for a phone visit with a doctor or a conversation with a grandchild. So we can't assume that a switch to virtual socialization or virtual access to resources is going to work for all elder people.

Further, aged people have manifold co-morbidities and augmented hospitalizations which escalates the probability of catching up the infection during an epidemic. In evaluation of COVID-19 persuaded pneumonia amongst young and elderly patients, it was found that development of infection and threat of death is three times higher in the elder age cluster (Liu et al, 2020). The amount of lung-sections involved, the requirement for automated ventilation, chance of blood-gas anomalies was all greater in the aged with poor growth of antiviral, antibodies and lower C-reactive protein (CRP), an effective indicator of inflammation. In one more analysis, one of the encounters in COVID-19 epidemic was the generic organ participation in the elderly as countless geriatric people have died due to sepsis and congestive cardiac failure, but witnessed no symptoms of pneumonia. Besides, older people might have cerebral and sensual deficits which mark it hard for them to understand and follow safety measures. Numerous of them are institutionalized exposing them to the peril of overpopulation, poor sanitation, and lack of sufficient observation. Appropriate testing is also hindered due to negligence and that increases the hazard of them being asymptomatic transporters.

Elderly and Prior Health Situations

The COVID-19 virus has severe impact on elderly people than other age clusters. Adults of 60 plus of age are more expected to already have disorders such as cardiovascular ailment, respiratory illness, or diabetes— co-morbidities that now increase the hazard of deadly COVID-19 and associated death. Moreover, a likely fragile immune system makes it tougher for elderly adults to fight against the infection. Consequently, the effect on elderly people is distinguished. According to World Health Organization (WHO) data from April 2020, over 95 per cent of deaths due to COVID-19 were amongst people above 60 years of age, and more than half of all deaths occurred in people of 80+ years.

For instance, in Sweden, 90 per cent of the deaths due to COVID-19 were among people who are aged more than 70 years. The Chinese Centres for Disease Control and Prevention presented statistics in March showing an average COVID-19 case fatality rate for people in their 60s is 3.6 per cent, 8 percent for those in their 70s, and approximately 14.8 per cent for people 80 years and above. “Older adults are at a significantly increased risk of severe disease following infection from COVID-19,” said Dr. Hans Henri P. Kluge, WHO Regional Director for Europe in a WHO press briefing, adding “Supporting and protecting older people living alone in the community is everyone’s business.”

The highest causalities due to COVID-19 are recorded in elderly care homes and similar facilities. These nursing and care homes for elderly are at highest risk of being affected by Covid-19. Largely, more than one third, i.e. 35 per cent of all COVID-19 mortalities in the U.S. occur in long-term care facilities, including inhabitants and workers. In Belgium, for instance, 53 per cent of the state’s entire deaths of COVID-19 happened in care institutions. In Canada, this percentage was 62. In France, the number varies between 39.2 to 51 per cent. In Spain, 67 per cent of all COVID19 demises happened in care homes. In the United States, almost 60 percent of all care home associated COVID-19 deaths were recorded in the state of New York. In other parts of the world, the condition looks terrible, as well.

Impact of COVID-19 on India and its Elderly

Covid-19 has hit the whole world badly and India is severely affected too. It is eating up India's labour force. A study by the researchers of International Institute of Population Sciences (IIPS), Mumbai, and others have establish that over 50 percent of Covid-19 losses in India have befell in the 35-64 or 40-64 age groups - the utmost parsimoniously industrious age groups. The magnitudes of mortality in the age group of 30-64 years is ascertained at 58.5 per cent whereas it is 53.5 per cent in the 40-64 years age group. It is also predicted that the Case Fatality Ratio (CFR) with 14 days postponement for India in any case is twofold higher— at approximately 8 per cent than the official CFR of 3.2. In view of 8 per cent mortality rate and varying scenarios of community infection by 0.5 per cent, 1 per cent and 2 per cent, India’s life expectancy will reduce by 0.8, 1.5 and 3 years and potential life years lost by 12.1 million, 24.3 million and 48.6 million years respectively[9]. It also said that community infection of 0.5 per cent may result in disability-adjusted life years by 6.2 per 1000 population.

The findings highlight that the pattern of deaths in India is in sharp contrast with developed countries where 70 per cent of the deaths have occurred in the age groups above 70 years[9]. Two key reasons for this are that our population age-distribution is such that the median age in the country is 24 years and hence, younger persons are available for infection diffusion as compared to other countries and similarly, a comparatively high incidence of diabetes and high blood pressure in individuals above 40. Age-wise mortality rate was also analysed and it is found that almost 60 per cent of the Covid-19 cases belong to the

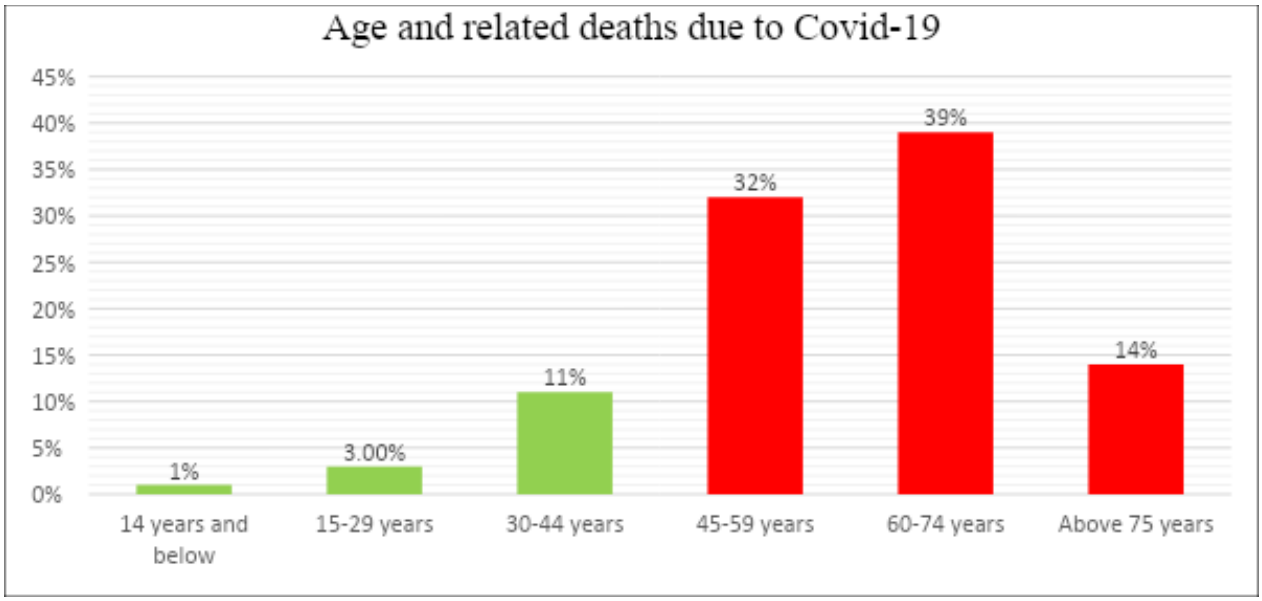
age group of 30-64 years; around 2.3 per cent of mortalities are under 15 years, 12.8 per cent are in the 15-44 age group, 48.2 percent mortalities are in the 45-64 age group and 36.8 per cent are in 65+ age group.

According to the analysis, a major share of the Covid-19 deaths is in the working-age group which is carried out with data available up to 9 May when there were more than 65,000 confirmed cases and nearly 2,100 deaths related to Covid-19. Above the age of 60, the possibility of mortality owing to Covid-19 in any case would be four times greater amongst the aged people equated with non-elderly, The likelihood of dying in the 15-60 age group would rise from 0.17 per cent without Covid-19 to 0.19 with 0.5 per cent community infection and 0.20 per cent with 1 per cent and 0.23 with 2 per cent community infection respectively. Patients above the age of 45 years, who make 25 percent of the nation's population, represent around 85 per cent of India's losses due to Covid-19, According to the Union health ministry, as it declared that the nation has been able to succeed in controlling the outbreak "relatively well" with cases and deaths per million of the population here among the lowest in the world.

The outcomes about the age-wise break-up of losses due to the Covid-19 disease in India are consistent with what scientists have witnessed about the world-wide developments of the disease and it is found that this virus is disproportionally deadly for those who are aged and above 60 years. Data released by government highlights that 85 per cent of all those who have deceased owing to Covid-19 in the country were over the age of 45 years. People between the ages of 60 and 74 years, who are just 8 percent of the population, form the prime fraction of mortalities— 39 per cent. Individuals older than 75 who are around 2 per cent of India's population, account for 14 percent of the total deaths due to Covid-19 (See Figure 1).

On the other side of the gamut, those under 14 years of age which counts to 35 per cent of the total population make up only 1 per cent of all mortalities due to corona virus in the country, and those between 15 and 24 years of age (18% of country's population) accounted for 3 per cent of the COVID-19 deaths. Individuals in the age group of 30 - 44 years (22% of country's total population) account for 11 per cent of the COVID-19 deaths.

Figure 1
Age-wise Distribution of Deaths due to COVID-19 as on 8 July 2020



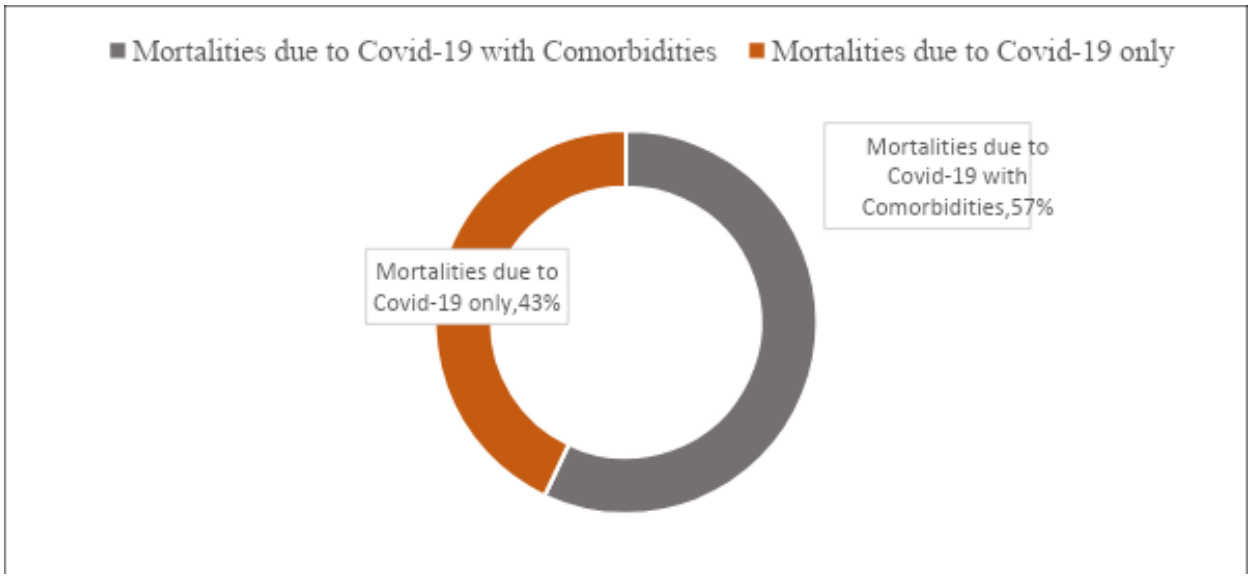
Source: Union Ministry of Health and Family welfare (MoFHW), 2020

This is the first time after the breakdown of this pandemic in two months that the government has provided with an age-wise division of mortalities in the country. The data released on May 1 showed that of the 51.2 percent who died were above the age of 60 years, 42 per cent between 60 and 75 years, and 9.2 per cent above 75 years of age[11]. According to the World Health Organization (WHO) report, India has 538 COVID-19 cases per million population. However, it is at least 16-17 times more in some countries. India has 15 deaths per million population, whereas some countries reported 40 times more deaths than India.

Co-morbidities

Comorbidity basically means more than one illness or disease occurring in one person at the same time. Covid-19 patients with prevailing health disorders (comorbidities) are more susceptible than other patients. Most of the patients with comorbidities and multi-morbidities belong to 60 and above age group. In the early days of the epidemic, each time a death occurred, the Government of India announcement commonly accredited it to a extensive list of comorbidities. However, the latest Integrated Disease Surveillance Programme (IDSP) analysis illustrates that comorbidities were recorded in 57 per cent deceased due to Covid-19 till 2 July 2020 and for 43 per cent, it was this virus alone that was accountable for the deaths in the country (see Figure 2).

Figure 2
Mortalities due to Covid-19 only and with Comorbidities as on 2 July 2020



Source: Integrated Disease Surveillance Programme (IDSP) Analysis, MoHFW, 2020

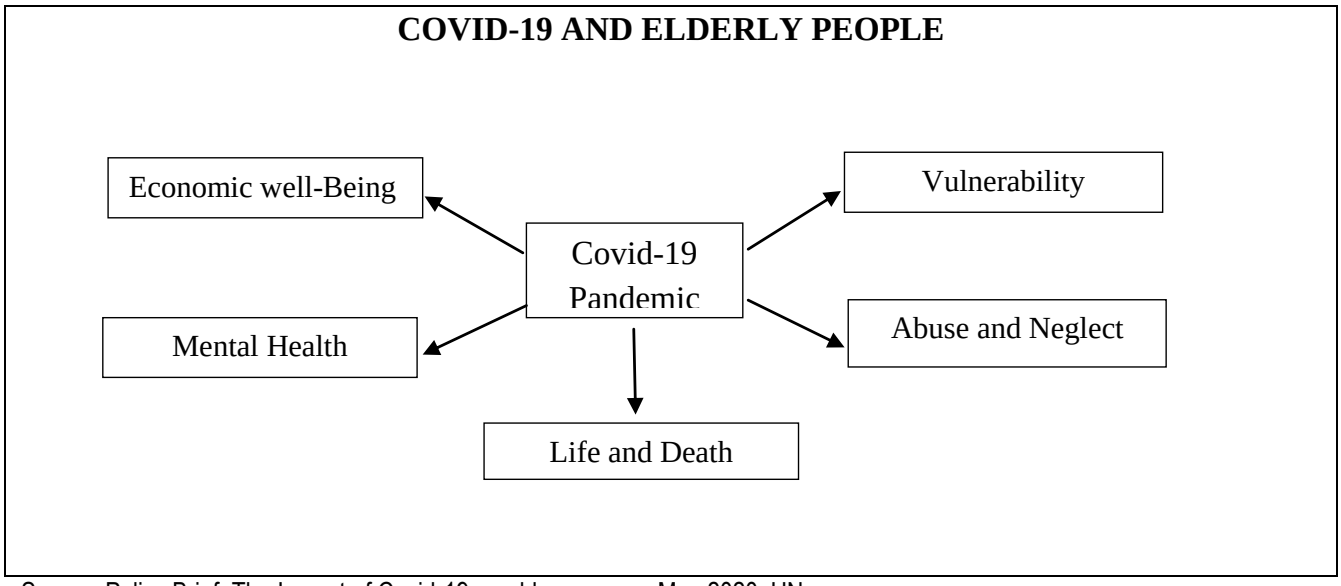
Elderly and Risks due to COVID-19

Life and Death: Even though the entire age clusters are at danger of being infected with COVID-19, elderly people are at a considerably greater risk of mortality and fatal ailment due to infection, with individuals over 80 years old dying at five times the normal rate. Around 66 per cent of individuals aged 70 and above have minimum one basic ailment, putting them at amplified risk of austere influence due to Coronavirus. Elderly people might also face age discernment in choices on health care, triage, and life-saving treatments. Universal disparities mean that, already pre-COVID-19, as many as half of elderly people in several

emerging nations did not have access to necessary healthcare facilities[12]. This epidemic may also lead to a surmounting back of serious health ailment amenities dissimilar to COVID-19, supplementary increasing menaces to the lives of elderly people.

Vulnerability and Neglect: Certain elder people encounter supplementary susceptibilities at this stage. The spread of COVID-19 in care homes and institutions is compelling a devastating toll on elder people's lives, with worrying information representing examples of mistreatment or negligence. Elder individuals who are quarantined or isolated or locked down with household members or caregivers may also face greater threats of abuse, violence and neglect. Elderly people living in unwarranted circumstances– for instance, migrant camps, informal and illegal settlements and prisons– are predominantly at risk, due to congested living situations, inadequate access to healthcare facilities, water and hygiene facilities, along with possible challenges accessing altruistic help and backing. Additionally, elderly people are also time and again among the caregivers countering to the epidemic, growing their risk of contact to the virus. This is principally precise of elder home-based caretakers, the massive majority of them women, who provide care for older persons, especially in contexts where health systems and long-term care delivery are feeble.

Figure 3
Impact of COVID-19 on Elderly People



Source: Policy Brief: The Impact of Covid-19 on older persons, May 2020, UN

Social and Economic Well-being

This Corona virus is not only intimidating the lives and wellbeing of elder people, it is also menacing their social networks, their access to healthcare amenities, their careers and their retirement pension. Individuals who usually obtain care at home and in the community– for instance, women over 80 years of age who are more than double as likely to live alone as men– danger being inexplicably affected by physical isolation methods. Elongated episodes of quarantine could have a grave effect on the mental health of elder people, with elder people less likely to be technologically sound and aware. The earnings and idleness impacts will also be substantial given that, at a universal level, the share of elder people in the labour force has improved by nearly 10 per cent in the past three decades[13]. Social security can provide a safety net, but the

coverage gaps in certain developing nations are substantial, with less than 20 percent of elder persons of retirement age receiving a pension.

Elderly and Mental Health

Epidemics have substantial psychosocial effect. Health anxiety, adjustment disorders, panic, despair, insomnia and chronic trauma are the foremost offshoots. Misrepresentation and uncertainty give growth to large scale frenzies[14]. Amongst them, the aged are particularly more susceptible. Social quarantine of the elderly is a "grave public health concern" because of their bio-psychosocial susceptibilities. Social isolation, however, is the main approach to tackle COVID-19, but it also the foremost root cause of solitude, predominantly in settings like nursing-care or old-age homes which is an autonomous risk factor for Anxiety disorders, misery, Depression, nervousness, and suicide. Social meeting and connect are vital during the public health failure, especially when "ageism" becomes a reason for stigmatization in this disregarded people. This points to disregard and healing negativism. Maximum senior citizen are neither at ease with smart mobile phones nor friendly with the social media platforms and its language, henceforth the safeguards for a epidemic need to be clarified to them in their own simple terms.

Mental impairment, and complications like bad temper, wandering and psychotic indications can deteriorate the anxiety and make it hard for them to follow the safeguards of isolation and hand sanitation. Besides, individuals with mental condition ailments (including elderly) are more exposed and are disposed to exacerbations in such a catastrophe. Perception and lack of healthcare application are supplementary issues contributing to their reduced care for the period of the COVID-19 epidemic. The considerable pressure produced by "info burden" can lead to fear and healthcare associated uncertainty which might lead them to escape quarantine, having terrible public health costs. Mental health is the keystone of public health, particularly in the elderly. Evidences gathered from previous epidemics like Influenza, SARS, Ebola etc. have substantiated that consistent telephonic therapy meetings, healthy interaction with household members, significant information, fulfilling the general medical needs and psychosomatic needs, and valuing their private space and self-worth are important mechanisms of mental health in the elderly. This permits sensitization at all levels for early discovery of mental health desires and plan suitable interferences, particularly for the weak old-age populace.

Initial reports have revealed that lockdowns increase the hazard of abuse among elder people. During the epidemic, elderly people have developed even more dependency on their caregivers, and, in a pattern similar to the one that has raised up the number of cases of domestic violence, several caregivers have used the epidemic to implement their control and mistreat the aged further. Elderly mishandling tends to happen more commonly in societies that lack mental health or social care means. Also, the offenders of the abuse are likely to have mental health disorders, as well as feelings of hatred while performing caregiving responsibilities. In line with a latest paper published in the journal "Aggression and Violent Behaviour", people who witness "elder abuse" are probably to develop mental health complications such as despair, anxiety disorder, depression and self-neglect situations that can only be made worse by lockdowns. Largely, lockdowns mean that more elderly are confined with their abusers and a number of wrongdoers unwillingly find themselves in a caregiving role, and that, as a result, there is a greater need for mental health and community support services.

Conclusion and Recommendations

This epidemic has unfolded extraordinary encounters to humankind and presents an inconsistent danger to the wellbeing, lives, health and fundamental rights of elderly people. It is essential to reduce these menaces by considering the wants and human rights of elderly people in this global effort to tackle the endemic. Simultaneously, many of these risks are not new. Elderly people have long been subject to insufficient safeguard of their human rights and overlooked in national policies and programmes. COVID-19 recovery is a prospect to set the stage for a more comprehensive, unbiased, equitable, and age-friendly society, fastened in human rights and guided by the shared promise of the 2030 Agenda for Sustainable Development to Leave No One Behind.

As elderly are more vulnerable to any disease including Covid-19 and have multidimensional impacts on their lives. Every government must ensure the monetary security using, for instance, universal pension coverage; immediate socio-economic relief measures and social security nets including access to food, clothing, water, essential goods and services along with basic healthcare facilities in this pandemic especially for elderly people affected by economic adversities. Upkeep with the elderly people and those providing care so they can access digital communication or alternative ways to keep contact with their families and social networks when physical engagements are controlled. Also, guarantee that information on procedures to guard themselves from COVID-19 and on how to access services reaches elderly people by working with civic establishments and volunteers and using a variety of arrangements that may be available to a large number of elderly people. Improve mobile facilities to ensure access to quarantine elderly persons or individuals with restricted mobility to assess their needs and to provide support.

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Relationship between Household Wealth Inequality and Child Health Status in Odisha, 2015-16

***Ujjwal Das and **Sibabrata Das**

*Research Scholar, Department of Public Health and Mortality, International Institute for Population Sciences, Govandi Station Road, Deonar, Mumbai, India. E-mail: ujjwaldas608@gmail.com.
**Professor and Head School of Geography, Gangadhar Meher University, Amruta Vihar, Sambalpur, Odisha, India E-mail: sibabrata2007@gmail.com

Abstract

The present study examined how the relationship between household wealth impacts on child health evolved during a time of significant economic change in Odisha based on fourth round Indian National Family Health Surveys data conducted in 2015-16. The main predictor was an innovative measure of household wealth that captures changes in wealth over time. The binary logistic model was used to examine malnutrition (stunting and underweight) and Cox proportional hazard model was used for under-five mortality analysis. The measure of economic inequality purpose used the rich-poor ratio, concentration index, and concentration curve. Furthermore, composite index was carried out to identify high poverty and malnutrition districts in Odisha. Analysis was conducted at urban/rural, and regional with district levels in Odisha. The results indicate that the relationship between household wealth and under-5 mortality weakened over time but this result was dominated by stunting and underweight. A child is more likely to survive when he/she is from a household with a high wealth status. Among other factors, birth spacing and maternal education were found to be highly significant to increase a child's survival probability. The southern part of Odisha malnutrition due to mortality is higher than the other part of Odisha.

Key words: *Stunting, Rich-Poor ratio, Concentration curve, Concentration index, U5MR, Cox proportional hazard model.*

Introduction

Efforts to reduce preventable deaths in children under 5 remained one of the major premises for setting the third goal in the Sustainable Development Goals (SDGs); thus, the world is currently working towards achieving good health and well-being by 2030[1]. Yet progress towards achieving goals in reducing socio-economic inequalities in child health may have been stymied by a critical gap in documenting and understanding trends in socioeconomic inequality in child health indicators particularly in less developed countries[2]. In developing countries, the child health-related gap between the rich and the poor is very large due to the poor economy and most of the population living in rural areas. India presents a typical scenario of South-Asia, fitting the adage of 'Asian Enigma'[3]; where progress in childhood malnutrition seems to have sunken into an apparent undernutrition trap, lagging far behind the other Asian countries characterized by similar levels of economic development[4,5]. In such countries, the health and nutritional benefits spawning from economic growth tend to be concentrated only among the economically advantaged sectors of the population[6,7].

Historically, Odisha has been one of the backward states and criticized regarding child health: under-nutrition is one of the leading causes of childhood morbidity and mortality. Its backwardness might be witnessed from the fact that according to UNDP report in 2007–2008 the state ranked 22nd among 23 Indian states regarding human development index value[8]. As per the latest available data 2015-'16, the under-five mortality rate (U5MR) for Odisha was 48 per 1,000 live births down from 78 per 1,000 in 2005-06, still much higher than the national level (37 per 1,000 live births, International Institute for Population Sciences and Macro International 2015-16). Declines in malnutrition were much smaller. The result suggested that in 2015-'16, 35 percent of children were stunted, compared to 43 percent in 2005-06 and. Similarly, in 2005-06, 40 percent of children were underweight, compared to 36 percent in 2015-16. In the southern part of Odisha mortality and malnutrition, are higher than in northern and coastal Odisha. Such differentials in health status in Odisha mainly most of the population reside in rural areas and those living in urban areas lack many basic amenities. A significant proportion of the population does not have sufficient access to food, sanitation facilities, or health care. Under-nutrition among children is often caused by the combined effects of improper or insufficient food intake, repeated episodes of infections, and inadequate care during sickness[9]. Additionally, under-nutrition affects somatic growth, impairs the immune system, and increases the risk of infection[10].

Past Research on Wealth and Child Health

A growing number of studies have examined inequalities in child health and child survival by household economic status in developing countries like India[11-13]. Most of the studies have assessed the levels of socio-economic inequalities in health using bivariate analyses, poor-rich ratios, concentration indices, and concentration curves. The nutritional status of under-five children in particular is often considered as one of the most important indicators of a household's living standard and also an important determinant of child survival[14]. Prior research work suggested that poor household hygiene, poor child-feeding practices, delays in seeking medical care, and seeking inappropriate care can compound the disease burden and undermine efforts to improve child health outcomes. Chalasani[15] found that between the first and third surveys in NFHS, wealth-based mortality inequality declined in urban areas but remained unchanged or increased in rural areas. This could be happened the effect of wealth gradually attenuated for infant and under-five mortality over three survey rounds[16]. Economically poor children living in urban areas suffer from more severe malnutrition, stunting, and wasting than the rest of the population[17]. A multi-country study indicated that the children of the urban poor have higher rates of stunting and mortality than their rural counterparts[18]. According to a study conducted in Ecuador[19], economic inequality is an independent determinant for childhood under-nutrition. Countries with a greater degree of economic inequality tend to have an overall poorer average population health status than countries with more economic equality. Several studies have found that children from poorer households tend to be more undernourished and less survives than children in wealthier households[6,7]. In addition to a higher level, stunting increased child mortality[20]. Using data from the Indian National Family Health Surveys, Chalasani and Rutstein[21] examined the infant and under-five mortality and malnutrition outcomes. They found that the relationship between household wealth and under-five mortality reduced over time, especially for boys, while the relationship between malnutrition and household wealth became stronger for both boys and girls. Krishna et al.[22] (2015) investigated the associations between household wealth and physical growth of children in four low- and middle-income countries and they confirmed that household wealth has a significant effect on early life matters for physical growth. However, the relationship between household inequality and a child's health status is not conclusive. A recent study in Mexico discovered that household poverty is not a necessary condition for children to be undernourished[23]. Additionally, a study in Cambodia found that acute under-nutrition in children was associated with a mother's feeding practices, parent's health-seeking behavior, and personal

hygiene; however, there was no association with household wealth status[24]. Therefore, the primary objective of this study is to investigate the association between household wealth inequality and childhood under-nutrition with under-five mortality in Odisha. We will also examine the effects of other potential risks and confounding factors on childhood under-nutrition and under-five mortality.

Methodology

Data

The present study uses the data from the fourth round of the National Family Health Survey (NFHS) which was conducted during 2015-16. The NFHS is one of the important large-scale demographic and health surveys in India which provides a sufficient source of information about population, fertility, mortality, family planning, health, health care utilization, and nutritional status. The NFHS-IV provides the district-level information corresponding to households based on a sample of 1,315,617 children born with a total of 699,686 women aged 15–49 years old from 601,509 households[25]. In Odisha, information was collected from 11,106 observations from the kid file for the last five years preceding the survey with the women age group of 15-49. All the women surveyed were asked to provide complete birth histories including sex, date of birth, and survival status for each live birth; the analysis uses the birth history data. The design of the survey is a multistage stratified cluster sampling- for two sampling designs a rural area and three-stage for the urban area. Detailed information is available in the national report[25].

Outcome Variable

The outcome variables of the present study are stunting (height for age), underweight (weight for age), and under-five mortality. The nutritional indicator of stunting is chronic nutrition and underweight is acute and chronic from long time undernourishment indicator. Whereas, underweight is defined as children in the age group, 0–59 months whose weight-for-age Z-score is minus two standard deviations below the median of the reference population, while stunting is considered children 0-59 months of age whose height-for-age Z score is minus two standard deviations below the median of the reference population. These two indicators' Z scores are computed by using the WHO-recommended reference population[26]. The WAZ of a child, for example, is the difference between the weight of the child and the median weight of the reference population of the same age and sex, divided by the standard deviation (SD) of the weight of the same group of children:

WAZ= wt-wrSD

And classified as no underweight ($z \geq -2$ standard deviation (SD)) and underweight ($z < -2$ SD). And outcome variable under-five mortality is assigned a value of 1 if the child died before 59 months and 0 if the child was alive at least until the age of 59 months.

Explanatory Variables

The household wealth status is used main explanatory variables in the analysis. In NFHS-IV, The economic variables of household wealth were combined into a composite index, known as wealth groups. In this paper the wealth index was classified into three categories using principle component weight, namely, Q1 and Q2 are considered poorest groups, Q3 is middle, and Q4 and Q5 are richest groups. To check the reliability of the wealth index, Cronbach's alpha reliability test was performed and the coefficient took the

value of 0.81 which is usually considered as a good result. As established in the reviewed literature, the number of bio-demographic and other socio-economic variables have also been used for a significant effect of wealth status on child malnutrition and under-five mortality analysis[27-30]. These variables are the place of residence (urban; rural), birth order (1; 2; ≥3), sex of the child (male; females), mother's age at birth (15-19 years; 20-29 years; 30-39 years; and 40-49 years), mother's education (no education; primary; secondary and higher secondary); caste (SC/ST; OBC; others), religious (Hindu; Muslim and others), mother's received the at least four antenatal care (yes; no), and delivery care (home; institutional). In order to separate regional level analysis, Odisha was grouped into three geographical regions: Northern, Southern, and Coastal based on National Sample Survey (NSS) region classification[31].

Statistical analysis

In the present study univariate, bivariate, and multivariate analyses are carried out. For the univariate level, the mean distribution is used to assess the distribution of the sample. The bivariate analysis involved comparing various child health indicators with household wealth status, bio-demographic, and other socio-economic variables. The concentration index is used to measure the overall inequalities in health indicators among the wealth quintiles[32]. The rich-poor ratio (Q5/Q1 and (Q2-Q1/Q5-Q4) is computed to understand the relative gap in child health status among the wealthy groups. The Life Tables method is generated to obtain estimates of infant, child, and under-five mortality in this analysis respectively.

The descriptive analysis is followed by multivariate analysis to examine the significant effect of wealth status on child health indicators, after adjusting confounding variables. Binary logistic regression is used for nutritional indicators for stunting and underweight, while the cox proportional hazard model is used under-five mortality analysis as it handles an even history framework censored cases with discrete-time variables[33]. The analysis was carried out statistical software STATA version 14.1 (StatCorp 2003). Finally, the composite index was generated to examine the association between household wealth and child malnutrition. Further, it is assumed that the composite index will provide relatively more stable and reliable estimates of household wealth and child malnutrition (stunting and underweight) since it is based on composite Z scores standard deviation of all two data sets. Maps have been created by the Geographical Information System package (Arc Catalog/Arc Map). The dark shade shows a high malnutrition district and the light shade represents relatively less malnutrition district.

Concentration Index

The Concentration Index is considered the standard tool for examining the magnitude of socioeconomic inequality in any health outcome[34]. It is defined as the following equation C=2nμi=1niRi-1
Where: ¡ is the health variable of interest for the *i*th person; μ is the mean of y; Ri is the *i*th-ranked individual in the socioeconomic distribution from the most disadvantaged (i.e. poorest) to the least disadvantaged (i.e., richest); n is the number of persons[35].

The value of CI ranges between -1 to +1. A negative value implies that the health variable is concentrated among the poor or disadvantaged group and a positive value implies for the richest or advantaged group of people. A zero CI implies a state of horizontal equity. A zero CI implies a state of horizontal equity which is defined as equal treatment for equal needs[11].

Findings

Table 1 shows the means various determinations of child health status at the state and regional level of Odisha. The result indicates that there was a significant difference in child nutrition, mortality, and proximate determinates between urban and rural Odisha. Childhood mortality and malnutrition were higher in rural areas as compared to urban areas. The possible reason is that rural households are far less likely to used improved sanitation facilities than urban households. And also rural women are much more likely than urban women to have had no education. Approximately one-third (31%) of mothers have no education with 15 per cent having a primary education and 50 per cent having a secondary or more education in Odisha respectively. Both rural and urban Odisha, however, had increased over time in the proportion of households with improved drinking water and sanitation, as well as in the education levels of mothers. But interesting point found that birth interval and mother age at birth. Although the birth interval was increased from 2005 to 2016 and urban areas had higher birth intervals than the rural area, but there was no remarkable difference in maternal age at birth between urban and rural areas as well as state-level in Odisha in two round survey. The regional variations show that the Northern and Southern regions have higher mortality and malnutrition than the Coastal region. These regions also have lower proportions of households with improved sanitation, higher proportions using solid fuel, and higher proportions of women with no education. Likewise, the percentage of the poorest household was higher in the Southern region with 53 per cent and the Northern region with 38 per cent respectively.

Table 1
Mortality, Malnutrition and Means of Determinates of Child Health at State and Regional Level in Odisha 2015-'16

Determinants of child health indicators	Odisha			Regions		
	Total	Urban	Rural	Northern	Southern	Coastal
Mortality (deaths/1,000livebirths)						
Infant mortality	39	20	43	40	48	30
Child mortality	42	21	48	28	38	26
Under -5 mortality	48	26	52	47	60	36
Malnutrition (percent 2SD below ref. median)						
Stunting	34.83	26.9	36.35	36.04	40.37	25.12
Underweight	35.76	28.04	37.25	38.83	41.85	23.14
Proximate Determinants						
Birth order (number)	1.95	1.78	1.98	1.87	2.15	1.73
Birth interval (months)	45.79	49.82	45.12	46.17	44.07	48.65
Mother's age (years)	3.08	3.08	3.09	3.06	3.08	3.12
Imp. Drinking water	0.87	0.93	0.86	0.84	0.87	0.91
Imp. Sanitation facility	0.28	0.58	0.23	0.33	0.18	0.39
Solid cooking fuel	0.84	0.48	0.91	0.8	0.89	0.8
Socio-economic Determinants						
Mother's Education						
No education	0.31	0.17	0.33	0.24	0.48	0.12
Primary	0.15	0.095	0.16	0.13	0.15	0.14
Secondary	0.5	0.58	0.48	0.55	0.34	0.67
Higher	0.053	0.16	0.033	0.072	0.028	0.7
Religion						
Hindu	0.93	0.88	0.93	0.95	0.89	0.94
Muslim	0.02	0.07	0.01	0.016	0.003	0.05
Other	0.02	0.005	0.001	0.005	0.0008	0.006
Caste						

SC/ST	0.52	0.38	0.54	0.55	0.64	0.30
OBC	0.32	0.32	0.31	0.32	0.28	0.36
other	0.15	0.30	0.13	0.12	0.072	0.31
Wealth Status						
Poorest	0.41	0.13	0.46	0.38	0.53	0.26
Poorer	0.26	0.17	0.27	0.26	0.25	0.28
Middle	0.18	0.24	0.17	0.18	0.13	0.26
Richer	0.10	0.24	0.074	0.11	0.061	0.15
Richest	0.051	0.21	0.021	0.075	0.030	0.056
N (mortality sample)	511	51	460	148	262	101
N (malnutrition sample)	9728	1569	8159	3052	4005	2671

Table 2 presents bio-demographic and socio-economic differences in child health indicators in Odisha, 2015-'16. It was found those children's come from the economic poor disadvantaged family had higher level stunting, underweight and under-five mortality as compared to those have come richest family. The bio-demographic factor mother's age at birth and birth order shows a U-shaped relationship with the child's health status. For example, child malnutrition and mortality are lowest for the mother's age 20-29 years and its substantially higher mother age less than 20 years and more than 35 years for both Odisha and regional level. A similar effect is also shown in birth order. The under-five mortality rate was lowest in the 2nd birth order and highest for the 1st birth order and it's steadily increasing with the increasing birth order. Among the socio-economic variables, a mother's education has a strong relationship with child malnutrition and child survival. The risks of child malnutrition lowered among children whose mother's completed higher education as compared to those mothers without any formal education. The disparity among the social group's SC/ST had the highest under-five mortality as compared to other social groups. Coming to pregnancy and delivery level characteristics, the highest number of child malnutrition occurred to the mothers who received less than four antenatal care during pregnancy and highest number of infant died at home without health facility during delivery respectively.

Another important finding that has been broadly overlooked in the table is the regional variation child health status in Odisha. The overall result suggested that the highest number of child malnutrition and under-five mortality was observed in southern Odisha followed by northern and coastal Odisha. It was explained larger intra-regional disparities within the state or of similarities in neighboring regions across the state. Whereas, in southern and northern Odisha highest number of poorest population, unimproved water and sanitation facility, low coverage literacy, and low coverage antenatal care was increased the gap of child malnutrition and mortality from the coastal Odisha.

Table 2
Bio-Demographic and Socio-Economic Differences in Child Health Status in Odisha 2015-'16

	Odisha			**Northern**			**Southern**			**Coastal**		
	Stunting	**Underweight**	**U5 MR**	**Stunting**	**Underweight**	**U5 MR**	**Stunting**	**Underweight**	**U5 mr**	**Stunting**	**Underweight**	**U5 MR**
Background Characteristics												
Wealth												
poorest	44.66	45.76	65.	48.0	49.2	63.	45.42	47.84	77.	36.46	35.25	43.

			20			12			61			0
poorer	35.74	38.26	50.51	36.86	42.26	32.02	40.75	43.78	65.22	27.98	26.79	48.22
Middle	25.69	25.47	34.53	26.48	30.93	37.61	32.26	31.12	28.19	20.17	17.05	34.61
Richer	20.26	20.06	20.22	22.29	27.27	36.62	26.95	21.48	13.92	14.39	13.17	15.61
Richest	14.72	12.7	15.0	16.23	16.67	20.60	14.29	12.7	15.81	12.68	6.34	8.63
Mother's age at birth												
15-19	36.03	37.65	52.01	29.63	33.33	72.21	43.7	42.02	72.26	27.66	34.04	1.0
20-29	33.86	34.75	41.62	34.99	38.63	38.36	39.03	39.77	56.36	24.81	22.70	29.23
30-39	35.94	36.71	60.24	38.78	39.04	57.56	42.07	45.39	69.26	24.74	22.55	51.26
40-49	47.58	50.81	91.61	44.78	49.25	12.59	51.11	55.56	77.59	41.30	39.13	77.10
Birth order												
1	33.44	33.15	43.02	37.22	39.94	45.03	38.82	41.05	68.26	25.33	22.53	34.15
2	30.59	31.7	40.26	30.15	33.38	37.20	36.43	35.26	51.26	22.22	19.99	30.36
3	42.84	44.33	63.25	44.88	46.98	51.89	45.58	47.15	54.36	32.30	32.68	88.10
4	44.94	48.01	73.26	48.39	50.18	81.56	45.25	49.7	68.14	37.25	36.50	80.89
Birth interval												
< 24 months	41.25	42.26	44.59	39.68	41.65	51.55	42.25	47.58	81.0	25.69	28.69	36.26
24-47 months	30.25	35.65	35.69	31.02	36.85	44.89	40.01	41.25	52.25	22.26	21.06	25.15
>48 months	38.26	31.26	23.78	22.48	31.07	35.69	35.69	38.29	39.10	16.59	18.24	19.21
Mother's education												
No education	46.68	48.23	71.26	52.54	52.96	66.10	45.22	47.51	84.25	41.55	41.22	52.13
Primary	38.4	40.99	47.25	40.99	42.96	53.12	40.33	44.72	27.25	32.34	32.61	53.10
Secondary	28.69	29.16	39.25	29.94	34.47	41.26	35.45	34.58	44.69	22.40	20.10	33.20
Higher	16.96	14.45	17.15	19.55	18.18	30.26	21.19	22.03	32.78	11.05	4.97	10.26
Sex of the child												
Male	35.46	36.41	52.0	37.46	40.72	48.69	41.43	42.76	67.59	24.61	22.46	36.79
Female	34.17	35.09	43.59	34.61	36.91	45.89	39.29	40.91	52.25	25.69	23.38	34.81
Child												

weight at birth												
<2.5 Kg	38.52	41.25	57.86	41.25	48.25	58.56	42.68	51.25	62.25	25.26	28.36	34.73
Normal	28.26	26.25	41.69	26.36	28.25	39.26	31.25	40.25	41.59	15.26	12.26	26.56
>2.5 Kg	30.25	35.26	48.20	29.26	32.20	42.21	35.26	45.25	48.59	18.26	16.28	29.56
Caste												
SC/ST	40.92	41.67	45.12	41.21	43.17	52.20	41.94	42.96	65.10	37.25	35.76	40.10
OBC	31.08	31.82	42.25	31.33	34.08	45.45	38.32	39.69	44.78	22.21	20.16	38.14
other	20.04	20.83	38.29	17.36	21.76	52.26	29.21	31.62	34.69	18.07	16.78	36.24
Religions												
Hindu	34.96	35.92	48.25	36.13	38.92	47.26	41.08	42.41	60.20	24.92	23.26	38.20
Muslim	30.93	22.68	20.96	33.33	35.56	71.10	30.77	7.69	10.20	30.15	19.85	15.20
Other	31.25	25.00	55.25	41.61	33.33	70.29	0.00	1.20	5.21	12.00	9.25	4.45
Received Antenatal care												
No	43.28	40.34	73.56	52.29	52.29	86.36.	45.56	42.6	71.26	32.82	27.45	68.75
Yes	34.46	35.56	47.26	35.44	38.33	46.48	40.15	41.81	60.26	24.72	22.91	35.26
Delivery care												
Home	46.08	48.36	71.25	51.33	52.8	65.48	45.59	49.08	80.89	36.99	33.56	44.85
Institutional	32.93	33.64	42.16	34.13	37.08	39.49	38.82	39.7	52.89	24.44	22.53	33.89

Table 3 shows district-wise differences in child age for stunting below minus two standard deviations in Odisha and its states by wealth quintile during 2015-16. The overall stunted children were 35 percent, ranging from 55% for the poorest to 15 per cent for the wealthiest quintile. However, a massive district-wise difference was observed in the mean child stunted, ranging from the highest for Subarnapur (46%) to the lowest for Cuttack (14%). The result shows that southern Odisha was the highest rate of stunted children followed by northern and coastal Odisha (Figure 1). Among southern Odisha six districts were coverage the highest rate of child stunted, these districts are Subarnapur, Malkangiri, Nabarangpur, Balangir, Rayagada, and Baudh. In northern Odisha, only two districts had namely Kendujhar and Mayurbhanj highest rate of stunted children. The lower prevalence of child stunted observed in coastal Odisha mainly Cuttack, Puri, Jharsugada district, etc. The overall result suggests that children belonged to poor household relatively higher rates of stunting than the non-poor households. Thus poor-non/poor difference was very high in northern and southern Odisha. The result also reveals that the ratio of the differences between the bottom two quintiles and the top two quintiles was well above 1.0 in six districts, indicating that the difference in stunted children between the top two (wealthiest and wealthier) wealth quintiles was relatively small compared to the difference between the bottom two (poorest and poorer) wealth quintiles.

Table 3
District-wise Stunted Children in Odisha by Wealth Quintile, 2015-'16

		Wealth Quintile					Measure to describe inequity		
		Poorest		Middle	Richest		Ratio	Difference	
District/Region	Overall	Q1	Q2	Q3	Q4	Q5	Q5/Q1	Q5-Q1	(Q2-Q1)/(Q5-Q4)
Northern	**36.04**	**48**	**36.86**	**26.48**	**22.29**	**16.23**	**0.34**	**31.77**	**1.84**
Bargarh	38.52	43.53	45.68	29.41	37.84	8.33	0.19	35.20	-0.07
Jharsuguda	33.47	58.33	35.66	28.7	25	15	0.26	43.33	2.27
Sambalpur	40.17	42.11	47.78	37.78	35	18.18	0.43	23.93	-0.34
Debagarh	32.23	44.06	24.18	18.92	16.67	13.67	0.31	30.39	6.63
Sundargarh	36.47	45.27	40.4	35.63	23.29	19.61	0.43	25.66	1.32
Kendujhar	44.81	56.65	30.56	24.24	26.32	10	0.18	46.65	1.60
Mayurbhanj	42.71	51.23	30.91	9.52	13.52	NC	NC	NC	NC
Dhenkanal	25.44	37.89	33.8	12.28	10	5	0.13	32.89	0.82
Angul	31.63	41.41	40.54	23.38	10.89	8.89	0.21	32.52	-0.43
Southern	**40.37**	**45.42**	**40.75**	**32.26**	**26.95**	**14.29**	**0.31**	**31.13**	**0.37**
Ganjam	29.73	32.73	38.1	26.87	20	29.17	0.89	3.56	0.59
Gajapati	32.56	36.42	34.18	20.59	24.14	25	0.69	11.42	-2.60
Kandhamal	36.65	40	32.97	29.73	20	NC	NC	NC	NC
Baudh	41.43	51.88	37.78	26.32	27.27	NC	NC	NC	NC
Koraput	40.18	46.56	40.91	27.78	30	NC	NC	NC	NC
Rayagada	44.09	51.55	42.7	36.36	29.41	NC	NC	NC	NC
Nabarangpur	44.8	49	41.67	28.57	33.33	NC	NC	NC	NC
Malkangiri	45.71	49.1	42.86	35.48	26.67	25.55	0.52	23.55	5.57
Balangir	44.08	49.58	46.88	38.98	26.09	14.29	0.29	35.29	0.23
Nuapada	37.93	43.98	35.71	21.05	36.36	12.44	0.28	31.54	0.35
Kalahandi	36.65	40	32.97	29.73	20	NC	NC	NC	NC
Subarnapur	46.55	47.47	46.46	47.06	30	10	0.21	37.47	0.05
Coastal	**25.12**	**36.46**	**27.98**	**20.17**	**14.39**	**12.68**	**0.35**	**23.78**	**4.96**
Baleshwar	33.07	34	35.62	28.3	33.33	28.57	0.84	5.43	-0.34
Bhardak	35.62	42.52	35.63	28	20.83	NC	NC	NC	NC
Cuttack	14.41	27.91	17.19	11.59	6.98	NC	NC	NC	NC
Jagatsingpur	18.6	22.45	24.66	14.81	11.76	NC	NC	NC	NC
Jajpur	30.64	45.83	31.94	27.66	14.29	17.65	0.39	28.18	-4.13
Kendrapara	26.03	35.38	27.16	13.11	16.67	NC	NC	NC	NC
Khordha	23	38.89	24.03	28.33	14.16	12.07	0.31	26.82	7.11
Nayagarh	27.29	45.83	29.07	25	17.39	NC	NC	NC	NC
Puri	15.86	21.05	26.97	5.29	6.25	4.56	0.22	16.49	-3.50
Odisha	**34.83**	**44.66**	**35.74**	**25.69**	**20.26**	**14.72**	**0.33**	**29.94**	**1.61**

Note: NC; Not Calculate, sample size below 25

Table 4 shows district-wise differences in child underweight below minus two standard deviations in Odisha and its states by wealth quintile during 2015-16. The result shows an average of 36 percent of children underweight in Odisha, among them 46 percent underweight children belonged to the poorest quintile and 13 per cent were the richest quintile respectively. Like stunted, the prevalence of highest underweight children was found in southern Odisha (42%), of Malkangiri district followed by northern (39%) and coastal Odisha (23%) respectively. The highest rate of underweight children among the poorest quintile was found in Kendujhar (57%) district and the lowest for Jajpur (6%) district in the richest quintile. There was a stark

difference of underweight children between poor and non-poor households in Odisha. In southern Odisha eight districts had the highest rates of underweight children's, these districts are Malkangiri (51%), Nabarangpur (50%), Koraput (44%), Balangir (44%), Subarnapur (44%), Baudh (43%), Rayagada (42%) and Kandhamal (41%). In northern Odisha, four districts were the highest rate of underweight these districts are Sambalpur (46%), Kendujhar (45%), Sundargarh (43%), and Mayurbhanj (42%). And among coastal part Jagatsingpur (16%), Cuttack (17%), and Puri (17%) were low coverage child underweight district in Odisha (Fig 1). Furthermore, the ratio difference bottom two quintile and the top two quintiles were above 1.0 in only four districts, indicating the highest underweight children belonged to the poorest quintile as compared to the richest quintile. The children belonged to poor households with low coverage sanitation facilities, unimproved drinking water, and the shortest birth interval was increasing the child underweight than the children to belong to the richest household. So underweight was the outcome most strongly associated with household wealth.

Table 4
District wise Underweight Children by Household Quintile, 2015-'16

		Wealth Quintile					Measure to describe inequity		
		Poorest		Middle	Richest		Ratio	Difference	
District/Region	Overall	Q1	Q2	Q3	Q4	Q5	Q5/Q1	Q5-Q1	(Q2-Q1)/(Q5-Q4)
Northern	**38.83**	**48**	**42.26**	**30.93**	**27.27**	**16.67**	**0.35**	**31.33**	**0.54**
Bargarh	38.52	44.71	48.15	30.88	24.32	16.67	0.37	28.04	-0.45
Jharsuguda	35.28	50	43.41	35.65	26.32	12.5	0.25	37.50	0.48
Sambalpur	45.73	47.37	54.93	48.98	40	9.09	0.19	38.28	-0.24
Debagarh	36.54	41.96	39.56	18.92	27.28	16.67	0.40	25.29	0.23
Sundargarh	42.55	47.3	43.71	45.98	38.36	25.49	0.54	21.81	0.28
Kendujhar	44.81	57.14	33.33	12.12	26.32	20	0.35	37.14	3.77
Mayurbhanj	42.37	50.25	32.73	9.52	23.08	NC	NC	NC	NC
Dhenkanal	28.98	38.95	36.62	15.79	20	10	0.26	28.95	0.23
Angul	34.82	44.44	43.24	27.27	15.56	17.28	0.39	27.16	-0.70
Southern	**41.85**	**47.84**	**43.78**	**31.12**	**21.48**	**12.7**	**0.27**	**35.14**	**0.46**
Ganjam	21.62	21.82	26.98	20.9	18	16.67	0.76	5.15	-3.88
Gajapati	32.23	37.09	36.71	23.53	10.34	12.5	0.34	24.59	-0.18
Kandhamal	41.1	42.86	40.66	32.43	20	NC	NC	NC	NC
Baudh	42.99	50.63	46.67	28.95	13.64	9.09	0.18	41.54	0.87
Koraput	44.17	47.09	53.03	36.11	30	6.67	0.14	40.42	-0.25
Rayagada	42.49	46.58	47.19	42.42	11.76	NC	NC	NC	NC
Nabarangpur	49.65	55	45.83	35.71	13.33	NC	NC	NC	NC
Malkangiri	50.71	53.79	52.75	41.94	13.33	16.67	0.31	37.12	-0.31
Balangir	44.08	52.1	43.73	30.51	47.83	14.29	0.27	37.81	0.25
Nuapada	40.32	52.36	38.78	17.54	9.09	9	0.17	43.36	150.89
Kalahandi	39.43	41.25	39.44	48	25	13.33	0.32	27.92	0.16
Subarnapur	43.79	48.48	50.6	35.29	40	10	0.21	38.48	-0.07
Coastal	**23.14**	**35.25**	**26.79**	**17.05**	**13.17**	**6.34**	**0.18**	**28.91**	**1.24**
Baleshwar	33.46	41	38.36	24.53	12.5	14.29	0.35	26.71	-1.47
Bhardak	28.08	36.22	22.99	20	25	NC	NC	NC	NC
Cuttack	16.95	27.91	28.13	11.55	4.65	NC	NC	NC	NC
Jagatsingpur	16.12	22.45	21.92	9.88	11.76	NC	NC	NC	NC
Jajpur	30.3	44.44	34.72	26.6	16.67	5.88	0.13	38.56	0.90
Kendrapara	23.49	29.23	23.46	14.75	22.22	NC	NC	NC	NC
Khordha	18.78	40.74	20.16	18.33	13.27	6.9	0.17	33.84	3.23
Nayagarh	25.37	41.67	29.07	20	13.04	12.5	0.30	29.17	23.33

Puri	17.24	28.95	28.09	9.38	6.25	10.53	0.36	18.42	-0.20
Odisha	**35.76**	**45.76**	**38.26**	**25.47**	**20.06**	**12.7**	**0.28**	**33.06**	**1.02**

Note**:** NC; Not Calculate, sample size below 25

Fig.1
Percentage Distribution of Stunted and Underweight Children by Household Quintile in Odisha, 2015-'16

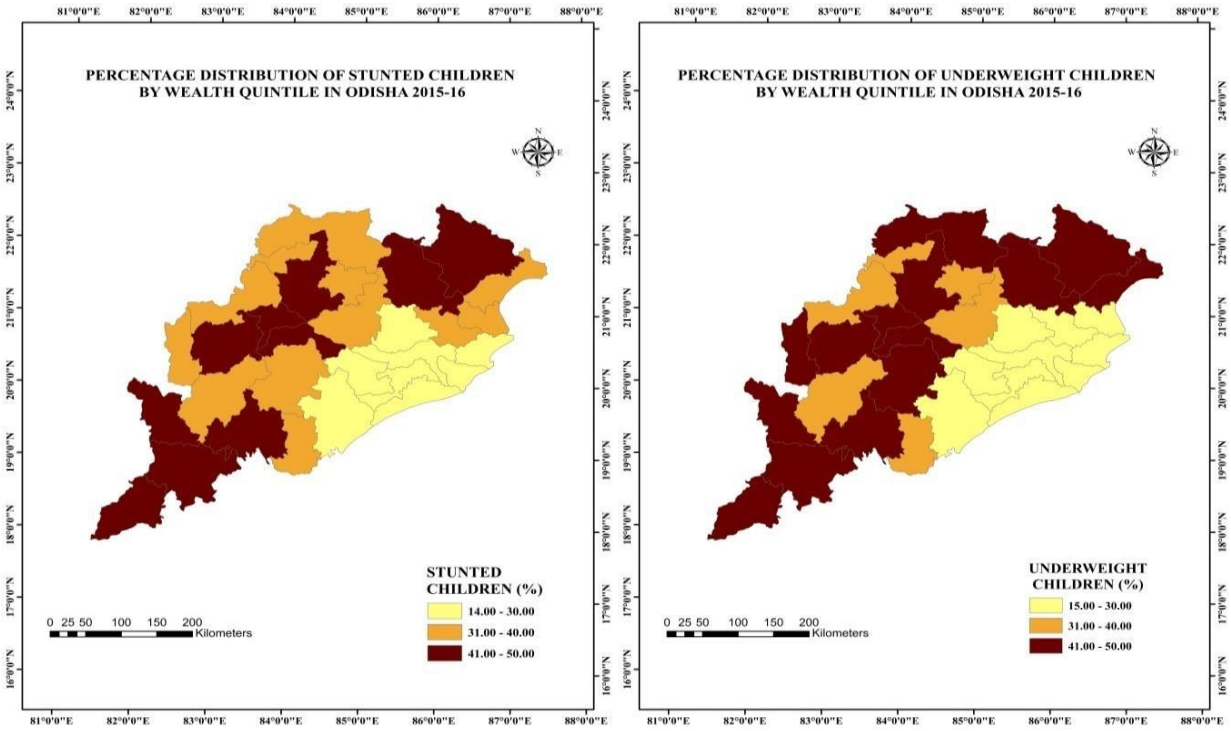


Table 5 showed the regional differences of under-five mortality rate by household quintile. It was found the highest number of mortality taken place poorest and poorer household followed by middle households. Those children have belonged to high socio-economic background family (richest quintile) the prevalence of under-five mortality rate relatively lower than the other community. For that reason the coastal Odisha mortality rates relatively lower than the others part of Odisha. The overall under-five mortality rate in Odisha 48 thousand per live births was estimated, ranging from 65 per thousand for the poorest to15 per thousand for the richest wealth quintile respectively. The region-wise highest mortality was found in the southern part followed by the northern part of Odisha, due to its higher social growth and partly to its favorable environmental and hygienic condition. Jain[36] highlighted the significance of maternal education and the poverty level in identifying regional inequalities in Indian child mortality rates. The rich-poor differences remained stark and stagnated over the periods. Overall results indicate that the under-five mortality rate differs vastly between the poorest quintile and richest quintile across the regions. Furthermore, results of the rich/poor ratio indicate substantive gaps in under-five mortality among the poor and non-poor in the states during this period.

Table 5
Region-wise under-Five mortality by Household Quintile in Odisha, 2015-'16

		Wealth Quintile					Measures to Describe Inequity		
		Poorest		Middle	Richest		Ratio	Difference	
Regions	Overall	Q1	Q2	Q3	Q4	Q5	Q5/Q1	Q5-Q1	(Q2-Q1)/(Q5-Q4)
Northern	47.20	63.10	32.26	40.26	37.26	22.36	0.35	40.74	2.06
Southern	60.29	78.15	65.23	27.89	14.26	17.36	0.22	60.79	-4.16
Coastal	35.56	43.25	48.36	33.87	15.15	9.21	0.21	34.04	-0.86
Odisha	47.89	65.14	50.41	33.84	21.21	15.26	0.23	49.88	2.47

Table 6
Concentration Index of Children Stunted, nderweight and under-Five Mortality by Wealth Quintile in Odisha, 2015-'16

	Stunting				Underweight			
Wealth Quintile	Odisha	Northern	Southern	Coastal	Odisha	Northern	Southern	Coastal
Poorest	-0.061***	-0.065***	-0.029	-0.070**	-0.058***	-0.065***	-0.026	-0.067**
2nd	-0.078***	-0.075**	-0.042	-0.110***	-0.063***	-0.064**	-0.034	-0.074**
Middle	-0.012	-0.040	0.013	-0.0004	-0.070**	-0.044	-0.052	-0.073
4th	-0.077	0.014	-0.127	-0.142*	-0.113**	-0.016	-0.203**	-0.191**
Richest	0.019	-0.134	0.044	0.103	0.140**	-0.127	-0.229	-0.102**
Total	-0.173***	-0.173***	-0.103***	-0.194***	-0.186***	-0.146***	-0.227***	-0.233***
	UNDER-FIVE MORTALITY							
Poorest	-0.088**	-0.044	-0.137***	0.037				
2nd	-0.015	-0.004	0.008	-0.049				
Middle	-0.090	-0.236**	-0.187*	0.024				
4th	-0.020	-0.133	-0.159	0.125				
Richest	-0.132	0.005	-0.356	0.128				
Total	**-0.197*** **	**-0.147** **	**-0.218*** **	**-0.150** **				

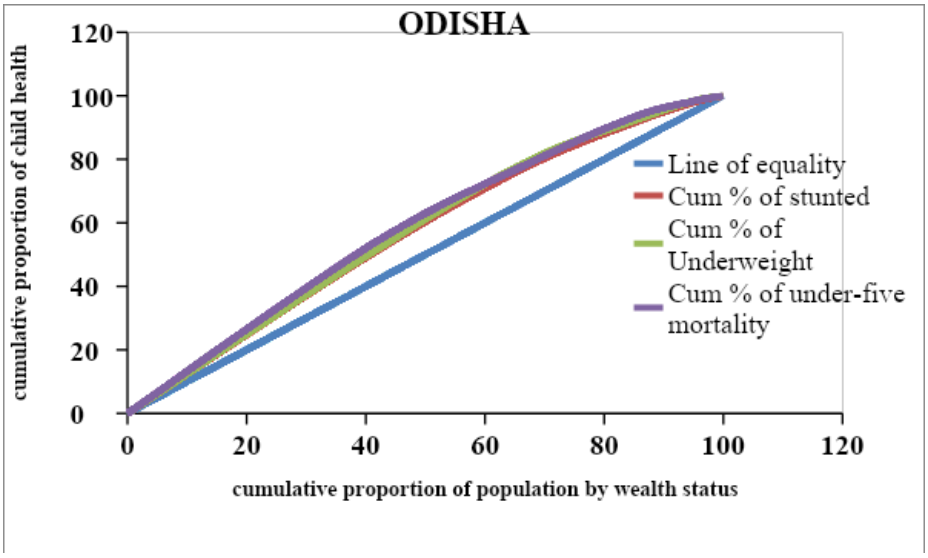
Note: *** p< 0.01, ** p< 0.05 & * p< 0.10

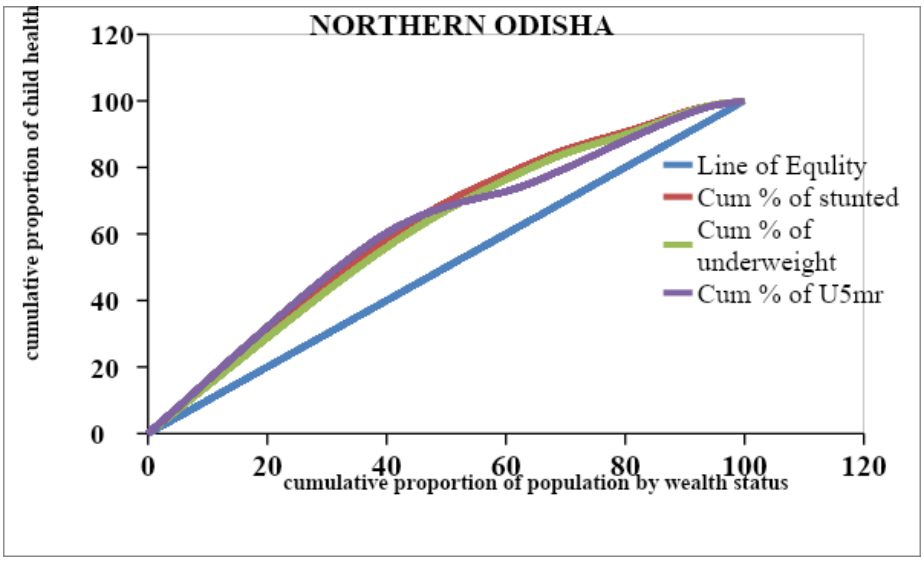
In order to measure the degree of economic inequality in selected child health indicators, the concentration index has been calculated in three regions and at the state level in Odisha in Table 6. The result showing the varying degree of economic inequality in regions consistently returns negative values, reflecting a heavy burden of malnutrition among the poor in Odisha. The above table confirms the fact that across all five quintiles and the three regions, children from poorer households share the higher burden of sub-optimal growth due to undernourishment. For child stunting and underweight poorest quintile are -0.061 and -0.058, indicating child malnutrition is higher among the poorest of the population. Similarly, the concentration index in children under-five mortality among the poorest -0.088 has higher than the others.

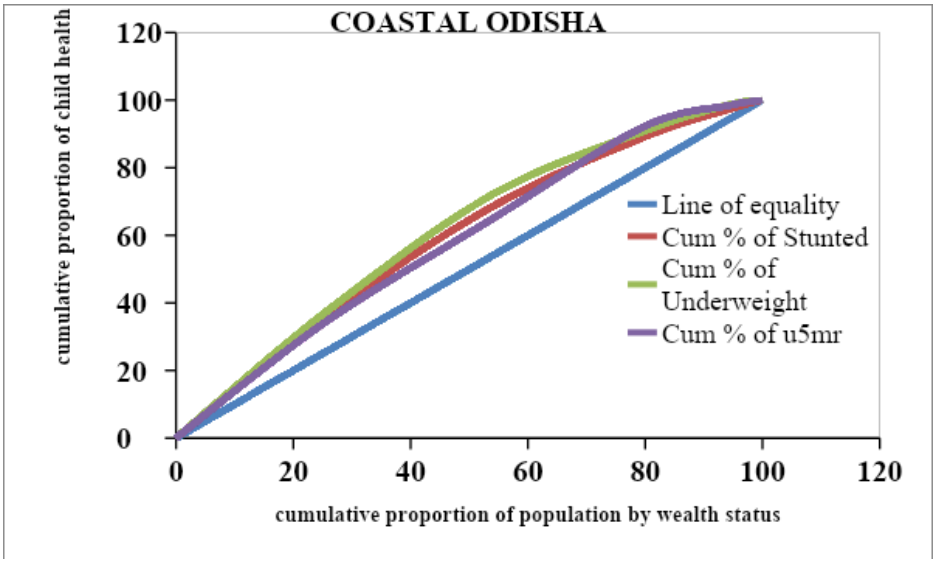
The concentration curve plots the cumulative percentage of the health variable (y-axis) against the cumulative percentage of the population, ranked by living standards, beginning with the poorest and ending with the richest (x-axis). Plots in Figure 2 confirm the above findings. Both Northern and Coastal Odisha curve lies above the diagonal (line of equality), which demonstrate that these outcomes are concentrated amongst poor. Whether in Southern Odisha these variables lie very close to the diagonal line that indicates

in Southern Odisha highest number of poorest population and child malnutrition (stunting and underweight) are equally distributed but the mortality rate relatively higher in Southern area thus mortality curve is increasing than the Coastal Odisha. Prior research suggested urban poor children are more stunted and underweight but not more likely to die than their rural counterparts. Lower child mortality in Coastal Odisha as compared to that in Northern and Southern Odisha comes at significant cost, and there is minimal to no financial protection for families experiencing catastrophic expenditures on health. So it needs special attention in Southern Odisha where chronic malnutrition among the children is more concentrated in the poorest household comparing their counterpart living richest household.

Figure 2
Region-wise Concentration Curve in Odisha







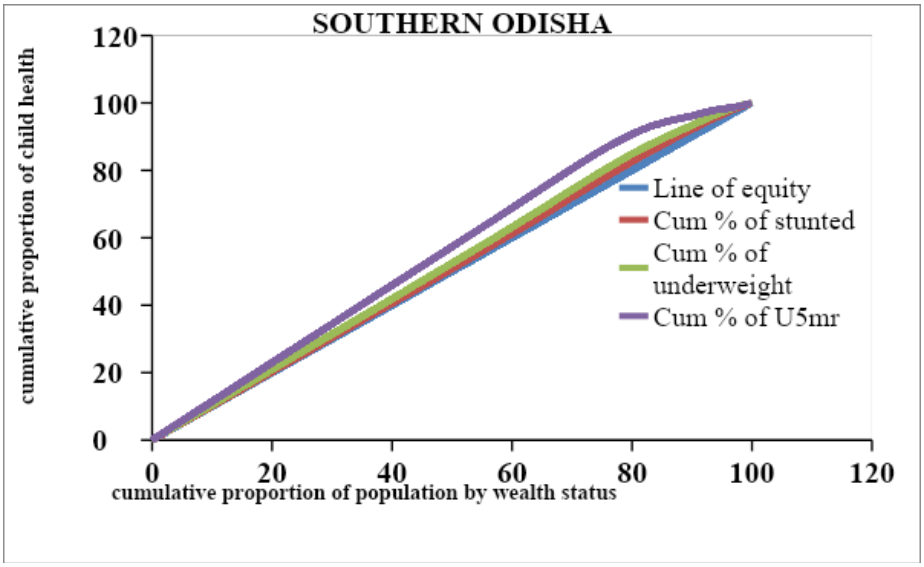


Table 7 shows the result from logistic regression at the state level. The odds ratios associating wealth with all outcomes are generally below 1.0 contributing to children from the wealthier households having lower odds of dying or being malnourished. The focusing on child malnourished (stunting and underweight) odds of suffering from childhood growth has declined consistently as the wealth index increased. Children from the richest wealth quintile 0.41 times (CI=0.299 - 0.567) for stunting and 0.35 times (CI=0.251 - 0.490) for underweight were less like malnourishment compared with children from the poorest wealth quintile with statically significant respectively. Birth order was also found to be a significant determinant of child malnutrition. Women have second birth order child are less likely to malnourished than those born are subsequently. Women's education emerged as a vital determinant in child nutrition. The women with middle and higher education were at lower risk of child stunted and underweight compared with below primary level or uneducated women. For considering the sex, males are reference category, risk of stunting for female child 0.95 (CI=0.871 - 1.038) times and underweight 0.94 (CI=0.867 - 1.033) times higher as compared to others without statistically significant. The children belonged to the Muslim community the risk of malnutrition relatively higher as compared to the other community with statistically significant. For health care factors antenatal care and delivery care played an important role in child growth. For example, during pregnancy, those mothers had received at least four antenatal care risks of child stunting and underweight relatively lower as

compared to those who have not received. The institutional delivery care declined child stunted 0.88 time (CI=0.778 - 1.008) and underweight 0.86 (CI=0.760 - 0.985) time as compare to home delivery. So the wealth quintile showed a significant positive effect on the utilization of full antenatal care. Moving to region-level analysis, the result suggested that children in coastal Odisha 0.68 and 0.58 times lower odds of child stunting and underweight than in northern and southern Odisha with 95 per cent confidence interval state respectively.

Table 7
Effect of Household Wealth Status and Other Selected Characteristics on Stunting, Underweight and Under-Five Mortality among the Children 0-59 Months, Odisha 2015-'16

	STUNTING		UNDERWEIGHT		U5MR	
Background Characteristics	**Odds Ratio**	**CI**	**Odds Ratio**	**CI**	**HAZ. Ratio**	**CI**
Wealth						
Poorest®						
Poorer	0.88**	0.776 - 0.974	0.91	0.849 - 1.065	0.73	0.507 - 1.155
Middle	0.61***	0.529 - 0.714	0.61***	0.526 - 0.710	0.31***	0.157 - 0.641
Richer	0.52***	0.421 - 0.647	0.43***	0.430 - 0.660	0.35***	0.042 - 0.548
Richest	0.41***	0.299 - 0.567	0.35***	0.251 - 0.490	0.30**	0.074 - 1.243
Mother's age at birth						
15-19®						
20-29	0.98	0.738 - 1.310	0.93	0.703 - 1.239	0.48**	0.205 - 1.120
30-39	0.96	0.711 - 1.305	0.89	0.655 - 1.195	0.56	0.225 - 1.402
40-49	1.18	0.796 - 1.758	1.16	0.781 - 1.716	0.68	0.220 - 2.088
Birth order						
1®						
2	1.02	0.917 - 1.138	0.96	0.868 - 1.077	0.89	0.582 - 1.356
3	1.21***	1.050 - 1.400	1.21***	1.05 - 1.408	0.89	0.520 - 1.509
4	1.09	0.919 - 1.294	1.19**	1.004 - 1.411	1.10	0.624 - 1.939
Birth interval <24 months ®						
24- 47 months	0.69*	0.556 - 0.859	0.74*	0.569 - 0.958	0.81***	0.695 -1.020
>48 months	0.56	0.256 - 0.892	0.68*	0.596 - 0.856	0.74	0.458 - 0.836
Mother's education						
No education®						
Primary	0.85**	0.740 - 0.977	0.90	0.788 - 1.039	0.31***	0.157 - 0.603
Secondary	0.74***	0.657 -	0.72***	0.642 -	0.74	0.488 -

		0.839		0.819		1.136
Higher	0.67***	0.504 - 0.908	0.52***	0.388 - 0.720	0.69	0.178 - 2.699
Child weight at birth						
< 2.5 Kg.®						
Normal 2.0 Kg.	0.56**	0.251 - 0.862	0.66*	0.458 - 0.962	0.74**	0.695 - 1.024
<2.5 Kg.	0.69	0.361 - 0.962	0.74	0.496 - 0.981	0.86	0.596 - 1.269
Sex of the child						
Male®						
Female	0.95	0.871 - 1.038	0.94	0.867 - 1.033	0.88	0.639 - 1.212
Caste						
SC/ST®	1.13**	1.001 - 1.282	1.33***	1.17 - 1.505	0.93	0.595 - 1.442
OBC	0.91*	0.811 - 1.038	1.038	0.917 - 1.175	1.11	0.687 - 1.786
other	0.53***	0.452 - 0.639	0.67***	0.566 - 0.795	1.59*	0.890 - 2.867
Religions						
Hindu®						
Muslim	1.57***	1.120 - 2.213	0.89**	0.622 - 1.299	0.65	0.153 - 2.783
Other	0.91	0.296 - 2.827	0.60	0.181 - 1.995	0.69	0.333 - 1.427
Received Antenatal care						
No ®						
Yes	0.84*	0.686 - 1.049	0.85*	0.851 - 1.310	1.63	0.710 - 3.732
Delivery care						
Home®						
Institutional	0.88**	0.778 - 1.008	0.86**	0.760 - 0.985	0.64**	0.434 - 0.949
Regions						
Northern®						
Southern	0.85***	0.741- 1.265	0.89***	0.698 - 1.298	1.25**	0.985- 2.260
Coastal	0.68***	0.526 - 8.521	0.58**	0.421 - 0.826	0.85***	0.526 - 1.226

Note: *** p< 0.01, ** p< 0.05 & * p< 0.10

We now turn to under-five mortality. Wealth effects are much weaker for under-five mortality than for child stunting and underweight. Coefficients on other explanatory variables suggest that household wealth, membership in a socio-economically advanced caste, and mother's education have significant protective effects on under-five mortality. Considering for household wealth status has a negative and significant effect on child survival. Thus, a child is more likely to survive when he/she is from a household with a high wealth status. For instance, the results from the hazard model indicated the top wealth quintile households had about 0.77 (CI=0.507 -1.155) times higher risk of under-fiver mortality than the bottom quintile 0.30 times (CI=0.074 - 1.243). Thus, the survival probability is lower for the poorest but relatively high for the richest. Similarly, the risk of Under-five mortality was significantly high for children born with maternal age at birth less than 20 years and higher birth order. The risk of mortality in the female child was 0.88

times higher as compared to males with the reference category. Because female children enjoy a survival advantage soon after birth but by the early childhood period, they are actually at a disadvantage compared to male children[37]. The regional level findings revealed that children under five years of age residing in the Northern and Southern Odisha had a significantly higher risk of dying than those residing in Coastal Odisha. This may be due to poor income and geographical access, which directly affects the health of children.

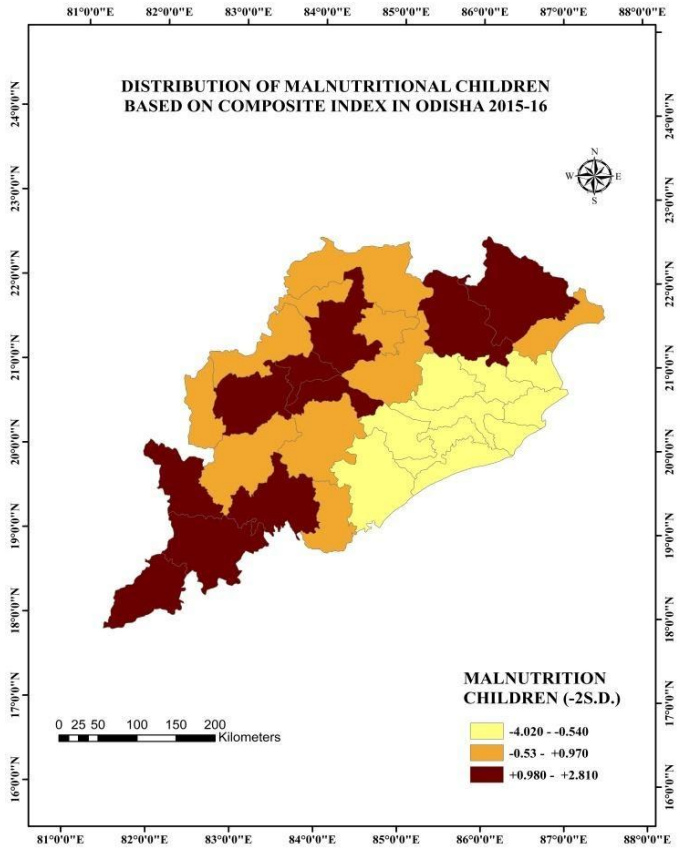
Table 8 represents high and low child malnutrition districts in Odisha based on the composite index. It must be noted that the composite index is the most reliable estimate as they have been a composite of all the factors[38]. Standardized scores (-2 S.D) have been used to classify the districts into high-medium and low malnutrition districts. The districts with high wealth status and malnutrition scores of -4.02 to -0.54 have been classified as low malnutrition districts. On other hand, the district with low wealth status and malnutrition score 0.97 to 2.81 has been classified as a district of high malnutrition based on a composite index.

Table 8
Represents Richest and Poorest Wealth Quintile /Child Malnutrition Districts Based on the Composite Index in Odisha during 2015-'16

Richest Wealth & Low Malnutrition (-2S.D) (RWQ= -1.77 to -0.53 & Malnutrition = -4.02 to -0.54)	Poorest Wealth & High Malnutrition (-2S.D) (PWQ=0.72 TO 1.44 & MALNUTRITION= 0.97 to 2.81)
Puri	Bargarh
Nayagarh	Sambalpur
Khordha	Sundargarh
Kendrapara	Kendujhar
Jajpur	Mayurbhanj
Jagatsingpur	Kandhamal
Cuttack	Baudh
Bhardak	Koraput
Dhenkanal	Rayagada
Ganjam	Nabarangpur
	Malkangiri
	Balangir
	Nuapada
	Kalahandi
	Subarnapur

The major districts that have high malnutrition include- Malkangiri, Nabarangpur, Kendujhar, Mayurbhanj, etc. The districts of low malnutrition have includes- Cuttack, Puri, Jagatsingpur, Khordha, Kendrapara, etc. Figure 3 shows the district-wise variation of child malnutrition based on the composite index. According to estimates, in the southern and northern parts of Odisha child malnutrition relatively higher as compared to coastal Odisha.

Figure 3
Distribution of Malnourished Children Based on the Composite Index



Discussion and Conclusion

The study aimed to examine the effect of household-level characteristics on children's malnutrition and mortality of under-age five and determine the effect of regional variation of malnutrition and under-five mortality in Odisha using the most recent NFHS-IV data conducted in 2015-16. The findings of the study show that the prevalence of child malnutrition and mortality in Odisha is widely varied across the place of residence (rural and urban) and also across the regions. This variance was mainly for clustering of observation at community and household levels characteristics. Whereas the children who ware belonged to the poorest SEC quintile have a higher prevalence of child malnutrition and mortality. While on the children hailing from richest asset quintile households are associated with better nutritional status. These findings indicate that impact of differential available resources to the families increasing the gap of nutritional status between poorest and richest households. Another significant finding is the regional variation, in a higher proportion of birth to mother having a no education or primary education with shortest birth interval was higher in Southern and northern regions. Thus excess female mortality due to the shortest birth interval and also malnutrition was higher in the Southern region compare to the Coastal part of Odisha.

Considering the economic inequality the Concentration Index has been calculated. Child malnutrition has stark as through the divergent values of the Concentration Index across the regions, highlighting the disproportionate burden among the poor. The higher inequality in malnutrition prevalence was observed at the lower levels of percentage of underweight children in Coastal Odisha. On the other hand, regions of

Northern and Southern Odisha with less economic development though considerably have a high prevalence of malnutrition exhibited lower values of the concentration index suggesting lower levels of inequality. It is particularly the prevalence of malnutrition biased against the poor is more pronounced in the region where absolute levels of malnutrition are low[39]. Prior study by Wagstaff A et al.[11] and Van De Poel E et al.[40] suggested that it is due to overall inequality in household assets among states, with poorest households major share of malnourished children. An analysis by Pradhan and Arokiasamy[41] suggests that child deaths were disproportionately concentrated among the poor households in the states grouped under the southern and western regions. A recent study by Pathak and Singh[29] reveals regional patterns in socio-economic inequalities in child malnutrition in India, result suggested that higher socio-economic in developing regions were highlighted on child malnutrition. Another fact that the rich are more likely to be used health care services than the poor and the inequalities are more likely to be pronounced in the coastal than in the north. There is a greater probability of this occurrence, because, with better availability and accessibility of services, the pace of use of these services among the rich and the poor is different, thus leading to an increase in the levels of socio-economic inequalities in health status and health care[42].

The result from the multivariate analysis confirmed that household wealth, mother education, and community hospital delivery have a significant effect on child malnutrition and mortality. Household wealth is an important predictor of mortality but there has no significant association at younger ages. This finding is consistent with variations in the causes of death at younger and older ages may explain the differences in the strength of wealth as a predictor of mortality[21]. The older children have longer exposure to time to the socio-economic condition of the house (wealth status) and physical environment which are adverse effects on child survival. While, children under the age of five more consistent with mother behavior, food, and health care facility. Being underweight was strongly associated with household wealth status. Apart from the wealth status, other community-level characteristics were affected by malnutrition and mortality that have included community bio-demographic factors, maternal education, community hospital delivery, etc. The finding suggested that children are having multiple birth statuses are more at risk to be undernourished than children who are single birth. The association between adverse growths - stunting and higher-order births may be due to competition for food within a household that is likely to be greater in the household with more children (Hong et.al, 2006). On the other hand, multiple births of children mainly due to couple want to the boy child, thus shortest birth interval with an excess of female child increasing risk morbidity and mortality among the female than boys. Sex-selective abortion does occur disproportionately among wealthier, better-educated Hindu women[43]. A major contribution to the high and plateauing under-five mortality, however, comes from the high incidence of low birth weight and premature birth which is associated with the poor coverage of institutionally organized safe deliveries. More than four-fifths of infant deaths are accounted for by prematurity, cough, respiratory and diarrhoeal diseases.

The mother's education and mother's antenatal care had a significant impact on child malnutrition and mortality. Descriptive analysis (Table 1) indicated that 7 percent and 3 per cent of mothers had higher education in Northern and Southern regions, whereas 70 percent of mothers had higher education in Coastal Odisha respectively. The larger gap in literacy among adolescent mothers across the region seemed to contribute to regional disparities in under-five mortality risk. Previous research shows that if mothers are wealthier in a community, they are likely to be more educated and have a greater understanding of health care behavior. Others can be affected by their awareness, experience, and attitudes[44]. Similarly, highly educated mothers received more antenatal care during the pregnancy which can positively impact on child growth and reduced the risk of under-five children deaths.

In conclusion, the results of the study indicate the inverse relationship between the levels of child malnutrition and under-five mortality with the household socio-economic conditions, and efforts to influence households' economic status. Moreover, the geographic regions have failed to ameliorate the rising socioeconomic inequalities with an overall decline in child malnutrition and mortality levels. This implies that irrespective of concerted programmatic played the dominant role over the last two decades to improve child health in Odisha, but there is persists sharp socio-economic disparities across regions; that is, babies particularly belonging to economically poor households have a consistently higher risk of death than those in relatively rich households. Surprisingly, this is more pronounced in the socio-economically and demographically advanced regions of Odisha. Based on the findings, the study suggests calls for a context-specific policy response. The mission of the National Health Mission (NHM) should be targeted toward removing the malnutrition level with improved health and nutritional status of the poor population, particularly the Northern and Southern part of Odisha. Furthermore, the NUHM should be addressed the economic growth for the removal of socio-economic inequity between poor and non-poor populations which will not only reducing poverty but also contribute overall burden of child health (particularly underweight, under-five mortality) in Odisha. In other public health intervention programs like National Nutrition Mission (NNM), National Midday Meal Scheme, the Integrated Nutrition and Health Program may have contributed to the improved child health status among the vulnerable people in Odisha. All the maternal and child health-related programs, for example, CSSM, RCH I and II, and NRHM have been framed at the national level and state level with few or no region-specific strategies. It is necessary to recognize this fact and frame the policies and programs to meet the specific needs of the states in the different geographic regions of Odisha. Another national level nutrition programme Poshan Abhiyaan which was launched by prime minister in 2018 have attempted to significantly reduce malnutrition in next three years mainly for high malnutrition state like Odisha, Bihar etc. In addttion, the Pradhan Mantri Matru Vatru Vandana Yojana (PMMVY) and Mothers Absolute Affection (MAA) launched nationally in 2016, that provides a conditional cash transfer to pregnant women for safe delivery, good nutrtion and protection and support of brestfeeding practices through health system to acheve higher brestfeeding rates and reduce the malnourshiment children in backward state in India. And finaaly special protection is needed to improve service coverage to poor mothers and their children irrespective of caste, creed, and religion to realize the Millennium Development Goals.

Limitations

We must point some limitations of the study. First, the wealth score is more a measure of long-term rather than short-term economic welfare. This matters if child survival and nutrition are more responsive to short-term measures of welfare such as household income[21]. Second, we also assumed that the functional form linking household wealth to child health did not change. But it affects the variation of child health indicators. Finally, although our hypothesis stated that household wealth instance of economic growth and general indicators of a change in the role of the state, we did not conduct a direct test of the role of government and public programs, and thus cannot report directly on the influence of those factors on our main effects of interest.

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Dynamics of COVID-19 and Socio-Economic and Demographic Vulnerability in the Districts of Gujarat: A Spatial Analysis

***Koustav Ghosh and **Gayatri Desai**

*Research Investigator, E-Mail: koustav.ghosh-prc@msubaroda.ac.in; **Assistant Director, E-mail:gsdesai61@gmail.com;
Population Research Centre (PRC), The Maharaja Sayajirao University, Faculty of Science, Vadodara-390002, Gujarat, India.

Abstract

The spread of the pandemic COVID-19 has posed a great public health challenge globally. In India, Gujrat is one of the worst states in terms of number of deaths wherein all the districts have been already affected by the spread of the disease. There is a need for a focused district level plan to reduce the number of deaths and spread of the disease. The study attempts to examine: spatial variations in positivity rate (PR) and case fatality rate (CFR) during lockdown and post lockdown periods and their relationship, if any, with the overall vulnerability level across the districts of Gujarat. Study has utilized NFHS-4, Census and govt. COVID-19 data. We have computed a composite index of vulnerability at district level using 2 broad indicators (socio-economic and demographic) consisting of 6 variables. Socio-economic variable includes: percentage of SC/ST population, percentage of Poor Households, Education Level. Demographic variable includes: percentage of Elderly population, percentage of urbanization and population density. We used a percentile ranking method to compute overall vulnerability and presented results spatially with PR and CFR in districts of Gujarat. Out of 33 districts 48 percentage of districts showed high CFR(>3%)during lockdown which reduced to 15 percentage districts in post-lockdown whereas high PR (>6.5%) has increased from 10 per cent to 30 per cent districts in the same duration.13 districts (Ahmedabad, Surat, Navsari, Vadodara, Chhota-Udaipur, Tapi, Panchmahal, Dahod, Valsad, Botad, Narmada, Mahisagar, Bharuch) were with high overall vulnerability (index value >0.60), among which 10 districts had Medium-high PR (>3.15%) and 3 had medium-high CFR (>1.5%). CFR reduced but PR increased across the districts. Vulnerability index helps to identify the backward districts with low PR & CFR. This in turn helps health planners to frame policies to check the spread of COVID-19 pandemic in the districts of Gujarat.

***Key words**: COVID-19, Lockdown, Positivity Rate, Case fatality rate, Vulnerability Index.*

Introduction

The first case of COVID-19 was reported in the Wuhan City in china on 31 December 2020 and in India on 27th January 2020 in Kerala[1,2]. The country witnessed the largest national lockdown from 24th March 2020 onwards which continued through different phases till 31 May 2020 to stop the spread of COVID 19 infection[3]. WHO declared COVID-19 as a pandemic on 11 March 2020 due to its large-scale spread across the world[4]. There are 215 countries affected by this pandemic with a total of 18902735 confirmed cases and 709511 deaths with the majority of the countries in community transmission stages[5]. Most of the

patients with COVID-19 infection had a travelling history and they infected others which increased the number of cases[6-7].

In case of India, the country faces the threat of a serious COVID-19 outbreak that would have far reaching consequences not only due to its large population but also for other reasons, including challenges in practicing social distancing, densely populated urban areas, non-universal access to water and soap for handwashing[8], a large number of people with chronic morbidities[9], a substantial proportion of the population living below the poverty line[10] and a large number of migrant workers who move from one state to another for their livelihoods[11].

One of the causes of concern is that according to data from the Indian Government, more than 80 per cent of confirmed cases in India are asymptomatic[12], making the population vulnerable to community spread of the virus. Although the COVID-19epidemic appears to be concentrated in districts which are more affluent and industrialized[13]; however, as millions of migrant workers from these places are returning to their home lands after the lockdown eased[14] the chances of spread of infection to the rural hinterlands of India is only a matter of time.

Moreover, COVID-19 has adverse impacts on demographic groups, such as that of the elderly with their underlying health problems[15]. In the fight against this pandemic, Geographic Information System (GIS) and big data technologies have been noted to play an important role in many aspects such as the rapid aggregation of multi-source big data, rapid visualization of epidemic information, spatial tracking of confirmed cases, prediction of regional transmission, spatial segmentation of the epidemic risk and prevention level, balancing and management of the supply and demand of material resources, etc. Such efforts have provided solid spatial information support for decision-making, measures formulation, and effectiveness assessment of COVID-19 prevention and control[15]. Across all the states of the country, Gujarat is one of the worst states of India in terms of the total number of deaths due to Covid-19. All the districts of Gujarat have been already affected by the spread of the disease. Considering the gravity of the situation, there is a need for a focused plan for the district level to reduce the number of deaths and spread of the disease.

The present study has been undertaken with an overall objective to understand the dynamics of COVID-19 outbreak in the state of Gujarat and across the different districts of the state. The specific objectives of the study are to examine the spread of COVID-19 in two different periods viz. pre and post lock-down through spatial mapping and to find out the relationship, if any, between case fatality rate (CFR) and positivity rate (PR)with the socio-economic and demographic vulnerability index.

Methodology

The data available on COVID-19 portal given by the Government of India has been used to represent the spatial variation and outbreak of Covid-19 in different phases in Gujarat. The analysis for the study has focused on two that is lock down phase (24 March 2020 to 31 May 2020) and post lock down phase(1 June2020 to 7 Aug 2020).National Family Health Survey 2015–16 and Census of India 2011 data source have been used for computing vulnerability index in the districts of Gujarat.

Socio-economic Vulnerability **:** We have used three indicators to calculate socioeconomic vulnerability: percentage of the population belonging to scheduled castes and tribes groups, to represent the education level of the population we have taken the percentage of the population with secondary or higher level of

education and to calculate the proportion of poor households consider as percentage of the population who did not have any of the assets i.e. motorized vehicle, television, computer, bicycle, refrigerator, thresher, and air conditioner or cooler as a proxy for poverty (Table 2).

Demographic vulnerability: Three indicators (percentage of aged population, percentage of urbanization and population density) have been used for computing the Demographic vulnerability index.

Construction of the vulnerability index: We have generated a composite index of individual variables and for two domains (Socio-economic and demographic). Taking the base of average, a total composite index was generated percentile rank methods used for calculate the overall vulnerability index in districts of Gujarat using the following formula: P= (rank – 1)/ (N – 1), where P is the percentile rank and N is the total number of districts. A higher percentile rank represents a greater relative vulnerability, with 1·0 being the most vulnerable and 0·0 being the least vulnerable .[12]

Table 1
Description of Variables for Calculating Vulnerability Index

Characteristics of Variable	Description of Variable	Data Source
Socio-economic Variable		
Scheduled tribe or caste households	Calculated as Percentage of households belonging to scheduled caste or tribe	Household File. National Family Health Survey-4 (2015–16)
Education level in population	Calculated as Percentage of population who completed secondary or higher level of education	Person File National Family Health Survey-4 (2015–16)
Poor household	Calculated that the percentage of house doesn't have any of the facility: a two-wheeler, car or truck, or tractor, television, computer, bicycle, refrigerator, thresher, or air-conditioner or cooler.	Household File. National Family Health Survey-4 (2015–16)
Demographic Variable		
Elderly population	Calculated as percentage of individuals in the population aged 60 years or older	Person File. National Family Health Survey-4 (2015–16)
Urbanization	Calculated as percentage of urban households among all household	Household File. National Family Health Survey-4 (2015–16)
Population density	Calculated as a ratio of population of a unit (district or state) and its area per square km.	Census of India 2011

As per NFHS-4, the data is available for 27 districts of Gujarat and not for the present number i.e. 33 districts of the state. Hence in the present study, the value for the newly formed districts was calculated by taking the average value of the original districts wherefrom the new district was formed. Thus, the analysis was done for all the districts of Gujarat.

Spatial Analysis

Spatial distribution of COVID-19 outbreak in Gujarat has been analyzed by considering Positivity Rate (PR) and Case Fatality Rate (CFR) (as on 07th Aug, 2020) in the two difference time periods (Lock down period and post lock down period) for 33 districts of Gujarat with the help of Arc-GIS 10.8 software. The districts were divided in to three categories based on PositivityRate (<3.15, 3.15% -6.5%,>6.5%) and Case Fatality Rate (<1.5%, 1.5%-3.5% and > 3.5%). In the Case of vulnerability index, 0-0.03 was considered as a low vulnerability 0.31-0.60 under the medium vulnerability and > 0.60 was taken as a high vulnerability index respectively.

Findings

Progress of COVID-19 during and post lockdown in Gujarat: Table 2 represents that as on 7th august 2020 Gujarat state, with all its districts, have been affected by the pandemic with a total of 68885 confirmed cases and 2604 deaths. The numbers of cases and deaths both have increased in the two time periods although the CFR and PR reduced in the same time periods. The Positivity rate (calculated as: confirmed cases/tests) of Gujarat reduced from 8 to 7 per cent, from the lockdown to post lockdown period while the number of tests increased three times more from lock down period to post lockdown period in the state. Similarly, the case fatality rate in Gujarat has reduced to almost half from 6 to 3 per cent during the mentioned time period. The recovery rate in the state has significantly improved from 59 to 80 per cent from lockdown to post-lockdown period, which is definitely a positive sign amidst this coronavirus crisis.

Table 2
Progress of COVID-19 in during and Post-Lockdown in Gujarat

	Lock Down Period (Till 31st May 2020)	Post Lock Down Period (Till 1st June to 7th Aug 2020)	Total
Population NCP 2019 Projection	67936000	67936000	67936000
Number of tests	205779	723878	929657
Tests per million	3029	10655	13684
Number of confirmed cases	16794	52091	68885
Number of recoveries	9919	41873	51792
Number of deaths	1038	1566	2604
Positivity rate (%)	8	7	7
Case fatality rate (%)	6	3	4
Recovery rate (%)	59	80	75
Test per positive case	12	14	13

However, there is an urgent need for all the countries, including India, to strengthen the public health surveillance and stop the spread of infection urgently.

Spatial variation on Positivity Rate and Case Fatality Rate with Vulnerability Index in Districts of Gujarat: Table 3 illustrates the Positivity rate and Case fatality rate with vulnerability index in the districts of Gujarat. The districts of Vadodara (10.3%) Rajkot (10%), Surat (10%) and Gandhinagar (9.5%) represent the high positivity rate whereas the Dangs (0.8%) and DevbhumiDwarka (0.9%) show low positivity rate as on 7 August 2020.

Table 3
Vulnerability Index and COVID-19 by Districts of Gujarat (In Descending Orders)

District	Positivity Rate	Case fatality Rate	Socioeconomic vulnerability	Demographic vulnerability	Overall vulnerability
Ahmedabad	8.4	5.9	0.355	0.751	1.000
Surat	10.0	3.3	0.285	0.706	0.969
Navsari	6.0	0.9	0.396	0.463	0.938
Chhota Udaipur	1.8	1.1	0.342	0.511	0.875
Vadodara	10.3	1.7	0.342	0.511	0.875
Tapi	2.2	0.6	0.580	0.232	0.844
Panchmahal	4.7	2.6	0.497	0.311	0.813
Dahod	5.5	0.7	0.637	0.159	0.781
Valsad	6.6	1.0	0.464	0.328	0.750
Botad	4.2	1.5	0.217	0.574	0.719
Narmada	4.6	0.0	0.575	0.173	0.688
Mahisagar	3.4	0.5	0.387	0.360	0.656
Bharuch	8.4	1.1	0.347	0.394	0.625
Rajkot	10.0	1.8	0.170	0.546	0.594
Kheda	5.0	2.3	0.278	0.409	0.563
Porbandar	1.8	2.4	0.196	0.478	0.531
Anand	3.9	2.5	0.226	0.439	0.500
Gandhinagar	9.5	2.6	0.261	0.400	0.469
Dang	0.8	0.0	0.629	0.018	0.438
Aravalli	3.2	7.4	0.417	0.223	0.375
Sabarkantha	3.8	1.6	0.417	0.223	0.375
Mehsana	7.6	2.1	0.231	0.398	0.344
Devbhumi Dwarka	0.9	5.4	0.176	0.438	0.281
Jamnagar	4.8	2.1	0.176	0.438	0.281
Morbi	3.9	2.1	0.188	0.423	0.250
Banaskantha	4.4	2.2	0.361	0.215	0.219
Patan	5.8	4.9	0.297	0.271	0.188
Amreli	3.9	1.7	0.125	0.438	0.156
GirSomnath	5.0	0.8	0.230	0.331	0.094
Junagadh	4.3	1.6	0.230	0.331	0.094
Surendranagar	5.5	1.1	0.206	0.300	0.063
Bhavnagar	6.6	1.6	0.080	0.398	0.031
Kutch	4.6	2.9	0.232	0.185	0.000

Furthermore, the Case fatality rate is high in the districts of Aravalli (7.9%), Ahmadabad (5.9%), DevbhumiDwarka (5.4%) and Patan (4.9%); the Dangs and Narmada districts reported zero CFR followed by Mahisagar (0.5%) and Tapi (0.6) which showed low CFR in Gujarat. In case of the vulnerability index, Ahmedabad (1.0) ranks the highest, followed by Surat (0.97) Navsari (0.94) and Vadodara (0.89) whereas Kutchh, Bhavnagar (0.03) and Surendranagar (0.06) represent low vulnerability index among the districts of Gujarat.

Spatial Variation on Positivity Rate and Case Fatality Rate in Districts of Gujarat

Figure 1 illustrates the spatial prevalence of Case Fatality Rate and Positivity Rate for different periods in the districts of Gujarat. Figure: 1 (A) shows that 48%of districts (Porbandar, Panchmahal, Anand, Amreli, Patan, Bharuch, Ahmedabad, Bhavnagar, Jamnagar, Gandhinagar, Kheda, Banaskantha, Mehsana, Surat

and Vadodara) have more than 3 per cent of CFR during the lockdown period. This reduced to 15 per cent of districts (Aravalli, DevbhumiDwarka, Ahmedabad, Patan and Surat) in the post lockdown period.

Moreover, 30.3 per cent of districts (all are under the zero CFR-Chhota Udaipur, Dahod, Dang, Devbhumi Dwarka, GirSomnath, Junagadh, Morbi, Narmada, Navsari, Tapi) are under the less than 1.5 per cent of CFR in lock-down period and it increased to 54.5 per cent of districts (Dang, Mahisagar, Narmada, Tapi, Dahod, Bharuch, Valsad, Porband, Anand, GirSomnath, Navsari, Surendranagar, Panchmahal, Sabarkantha, Vadodara, Bhavnagar, Chhota Udaipur, and Botad) after the lockdown. The remaining 21.2 per cent of districts are under the range of 1.5 - 3.0 per cent CFR in the lock down period whereas 33.3 per cent of the districtsare in this range in the post lockdown period.

Figure 1 (B) shows the Positivity Rate (PR)across the districts of Gujarat. The PR (>6.5%) has increased from 10 to 30 per cent of the districts in the post-lockdown from the lock-down period. During the lock-down period, 3 districts like Ahmedabad (15.4%), Vadodara (10.8%), and Mehsana (8.1) have more than 6.5% of PR whereas 10 districts viz. Rajkot (11.9%), Gandhinagar (11.5%), Surat (11.3%), Vadodara (10.2%), Bharuch (9.9%), Valsad (9.2%), Navsari (7.8%), Bhavnagar (7.7%), Mehsana (7.5%), and Dahod (7.0%) were on the same level (>6.5%) of PR after the lock-down in Gujarat.

Simultaneously 66.7 per cent of the districts (22 districts) were having< 3.5 per cent level of PR in the lock down period but after the lockdown only 21% of districts showed the same level. They upgraded in the medium (3.5%-6.5%) or higher (>6.5%) range from the lower (<3.5%) range.

The remaining 24 per cent (8) of the districts and 48 per cent (16) of the districts are under the range between 3.5 to 6.5 per cent in the lock-down and the post lock-down period respectively.

Figure 1 (A)
Spatial variation on case fatality rate in districts of Gujarat

During Lockdown (Till 31st May)	*Post Lockdown (1st June to 7th Aug)*

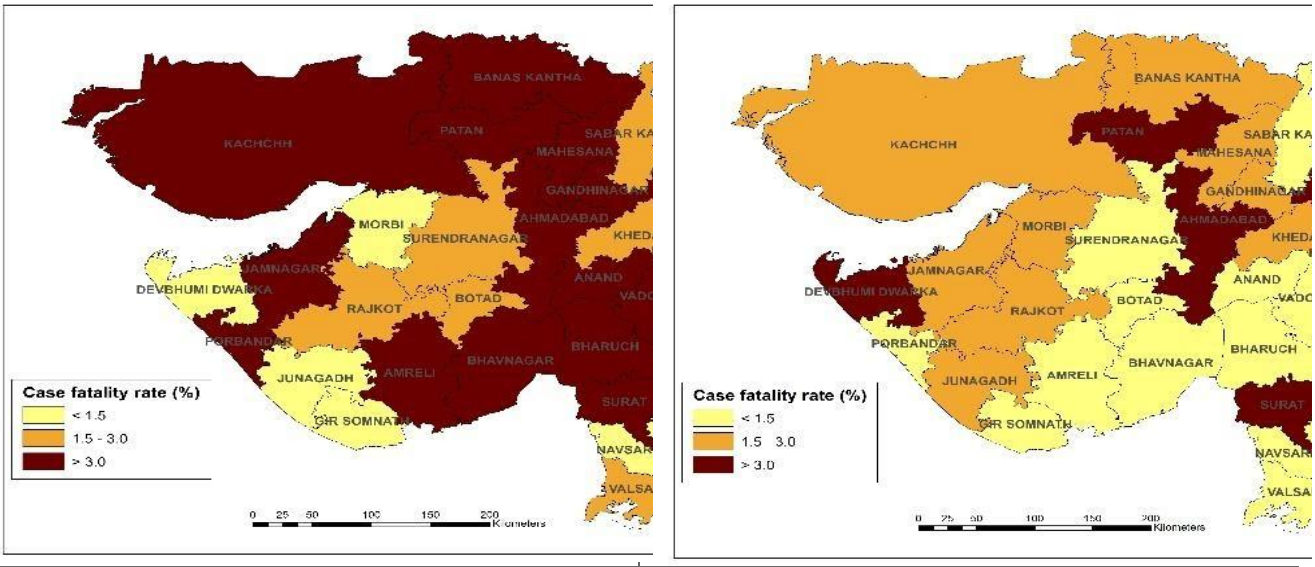
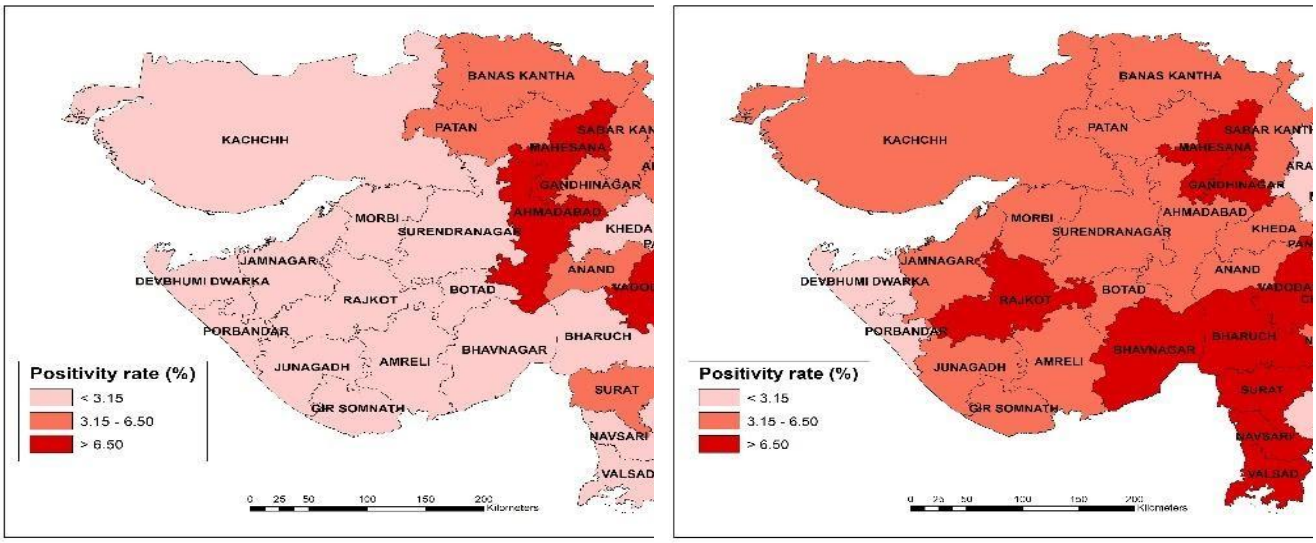


Figure 1 (B)
Spatial variation on positivity rate in districts of Gujarat

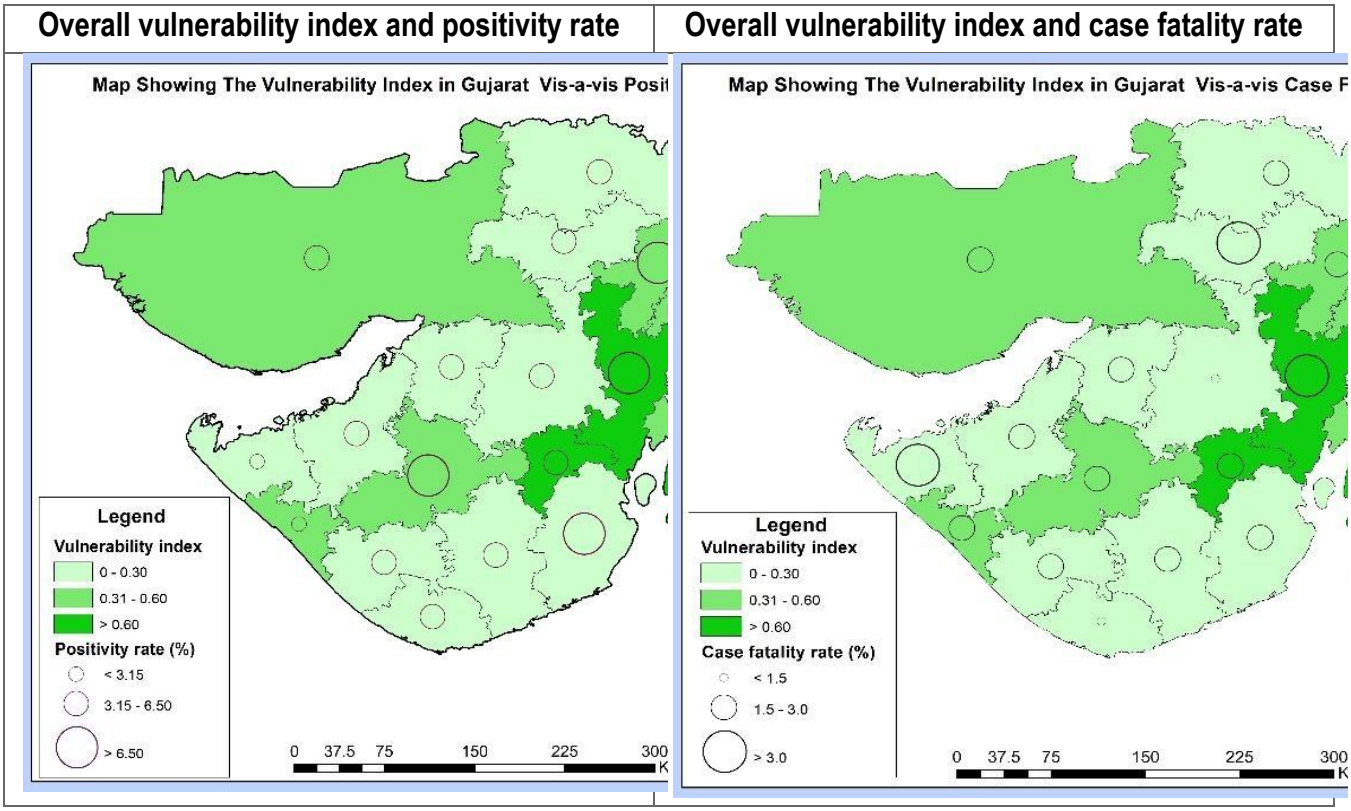
During Lockdown (Till 31st May)	*Post Lockdown (1st June to 7th Aug)*



Spatial variation of overall vulnerability index along with the positivity rate (PR) and case fatality rate (CFR) in districts of Gujarat: As indicated in the above figure (Figure 2), 39 per cent of the districts viz. Ahmedabad, Surat, Navsari, Vadodara, Chhota Udaipur, Tapi, Pancmahal, Dahod, Valsad, Botad, Narmada, Mahisagar, Bharuch, belong to the group having more than 0.60 of vulnerability index and 27 per cent (9) of the districts viz. Rajkot, Kheda, Porbandar, Anand, Gandginagar, Dang, Sabarkantha, Aravalli, and Mehsanafall in the range of 0.30-0.60 vulnerability index and the remaining 33 per cent (11) districts arehaving<0.3 vulnerability index. In case of Positivity Rate,out of 13 vulnerabledistricts (VI=>.60), 5 belong to the category of high Positivity Rate (>6.5%) and 5 are under the medium PR (3.5%-6.5%). Out of the 5

districts which have high CFR (>3.0), 2 districts (Ahmedabad & Surat) have high (> 0.6) vulnerability index whereas 1 district (Arvalli) represents medium vulnerability index (0.3 – 0.6).

Figure 2
Spatial Variation of Overall Vulnerability Index with the Positivity Rate (PR) and Case Fatality Rate (CFR) in Districts of Gujarat



Discussion

As on 7 August 2020, a total of 68885 COVID-19 infected cases and 2604 deaths were found in Gujarat. 48 % of the districts showed high CFR(>3%)during the lockdown which reduced to 15 per cent of the districts in the post-lockdown period whereas PR (>6.5%) has increased from 10 to 30 per cent of the districts inthe same period. Thus, CFR reduced but PR increased across the districts of Gujarat. Vulnerability index used in the present study helps to identify the backward districts with high PR and high CFR. An important finding of the study was that 13 districts (Ahmedabad, Surat, Navsari, Vadodara, Chhota-Udaipur, Tapi, Panchmahal, Dahod, Valsad, Botad, Narmada, Mahisagar, Bharuch) were with high overall vulnerability (index value >0.60), which included 10 districts with Medium-high PR (>3.15%) and 3with medium-high CFR (>1.5%).

Conclusion and Recommendation

Thus, in Gujarat as in certain other states of the country, the pandemic of COVID-19 has become a major public health challenge. The present study, with the help of the vulnerability index, has highlighted the backward districts of the state having high PR &high CFR. The study findings can provide essential inputs

to the planners for framing a policy for the districts with high and medium vulnerability. Such efforts are crucial for combating the spread of COVID-19 pandemic in the districts of Gujarat.

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Impact of COVID-19 on Livelihoods of Returned Manipuri Migrants

***Jasmine Maringmei and *Trupti Patil**

*Indian Institute of Technology, Bombay; E-mails: jasminemaringmei@gmail.com / truptipatil.16sep@gmail.com.

Abstract

According to NSSO 66th round, during 2009-10, the unemployment rate for Manipur was higher than the national average. Similarly, in 2020 Manipur witnessed a higher unemployment rate due to unemployed Manipuri migrants' return to their hometown as an effect of the Covid-19 pandemic. The first objective of this paper is to identify the drivers that influence the decision of return migration, adopting Lee's push and pull factors for Manipuri migrants. Secondly, examine the impact the pandemic has had on their livelihood. The study utilized a mixed-method approach-qualitative as well as quantitative. In the first step, quantitative data was collected from 1037 participants through Manipur Society for Skill Development, Government of Manipur for July and August 2020. In the second step, the study uses semi-structured interviews with 56 return migrants (8 from each sector - student, Tourism and Hospitality, Healthcare, IT sector, Retail, BPO, and Beauty and Wellness) were conducted from July to September 2020. Most of the returned migrants are the sole providers to their families. The pandemic has reduced their ability to continue working, which increases the chances of poverty. During the nationwide lockdown, they have exhausted the little savings they had in paying rent, buying essential commodities, and could not afford to support their families. However, return migration can be a positive strategy of livelihood and an opportunity to build a resilient labor market.

***Key words**: Covid-19, Return Migration, Manipur, Livelihood*

Introduction

Migration is the movement of people from one place to another, and this movement can be permanent, occasional, or seasonal. Migration has often been studied as a one-way process in scholarships, depending on the researcher's locational and disciplinary perspective. Such scholarships have influenced migration analyses, with return migration as the shadowy feature of the migration process even though it is followed by some returning. Return Migration has been studied by various disciplines, from cultural anthropology to demography, sociology, and economics. However, defining return migration has limitations as 'the terminological sloppiness found in the relevant literature presents us with considerate difficulties in the study of return migration1'.

In "The Sociology of Return Migration: A Bibliographic Essay," Frank Bovenkerk (1974) states that it is customary for authors working on return migration to complain about the lack of theoretical and empirical knowledge on this subject. This statement stands true even today concerning our study of the Manipuri migrants because of the existing gap in documenting migrants. In this study, the term "Manipuri" has been used to characterize people native to the North-Eastern State of Manipur in general. We are aware of the complexity which exists behind the lexicon of being called a "Manipuri." By generally calling the migrants

from Manipur "*Manipuris*," we have no intention to devalue the history and movements of the ethnic communities of Manipur who for decades have been contesting for their identities. The first objective of this paper is to identify the drivers that influence the decision of return migration, adopting Lee's push and pull factors for Manipuri migrants. Secondly, examine the impact the pandemic has had on their livelihood.

Return migration is a part of the migration process as many people move back to their place of origin for various political, economic, or social reasons. Likewise, in the year 2020, Manipur witnessed a higher unemployment rate of unemployment compared to the previous years due to unemployed Manipuri migrants' return to their hometown as an effect of the Covid-19 pandemic. The COVID-19 pandemic has compelled the Manipuri migrants to return to Manipur due to the uncertainties ahead. Therefore, it is crucial to have a theoretical and comprehensive understanding of the return migrants, over-viewing the existing gap in the literature.

Background

Before we discuss how Covid-19 pandemic affected the livelihood of the Manipuri migrants and the sustainability of their return. It is inevitable to not talk about the factors that have influenced these migrants to leave their place of origin to their place of destination. Due to the prevailing unfavorable conditions of high unemployment, limited job opportunities amidst the social and political unrest are the significant factors that compel migration into metropolitan cities[2]. Despite the social discrimination and marginalization they face at the place of destination.

Migration is rapidly growing not only from the urban areas of Manipur, but also from the remote areas of Manipur due 'to the increased in access of communication technology creating a phenomenon of chain migration i.e. prospective migrants learn of opportunities, are provided with transportation, and have initial accommodation, and employment arranges using primary social relationships with previous migrants[2]'. On the same note, McDuie-Ra, in his book "*North-East Migrants in Delhi: Race, Refuge, And Retail*," writes that the opportunities in the global city's neo-liberal spaces fuel an increase in migration from the North-East. These so-called neo-liberal transformations in cities such as Delhi, Mumbai, Bengaluru, Hyderabad, and Chennai have created the northeast migrants' opportunities in retail, hospitality, and BPOs[3]. Opportunities in these sectors become one of the pull factors because employers want to hire people from the North-East region targeting their distinct appearance, English language skills, their exotic and global aesthetic in these occupations.

Much of the North East region has been characterized by armed insurgency and counter-insurgency for the past six decades to pursue separatist demands and ethnically exclusive homelands[3]. At the same time, as McDuie-Ra writes, the opportunity to study outside the region is a significant impetus for migration for people from the North-East Region of India. The places of destination with the availability of work mean that migrants can support themselves during their study and simultaneously support other family members[3]. The decision to migrate has attracted not only those belonging to middle to lower income families but also 'the wealthy, well- connected and educated population from the North-East[3]'. Similarly, the determinants to migrate are not limited to employment opportunities or escape from arm-conflict in their native places, but also to study, up-skill their pursuit, and start or branch out business venture in the cities.

Literature Review

According to Russel King (1986), before the 1960s, the literature on migration had negligible reference to the phenomenon of migration. Such drawback does not justify this gap in migration studies which progressed over the years because one cannot ignore that return migration exists. The literature on migration proceeded to assume that no returns ever took place and been neglected by migration scholars[4]. It was not until the 1980s that stimulating scientific debates among scholars took place on the return phenomenon and its impact on origin countries[4].

In "*Return Migration and Regional Economic Development: An Overview,*" King made a temporal classification on return migration, consisting of occasional, periodic, seasonal, temporary, and permanent returns, elaborated as follows

1. Occasional refers to short visits for personal reasons and does not involve any real economic activity or employment; usually, the migrant returns for a period of relaxation and leisure[5].
2. Period returns are similar to occasional migration, except that this return is regular, such as every month or every weekend
3. Seasonal returns are dictated by the nature of the jobs followed: examples are crop harvesting, construction work[5].
4. In contrast, temporary returns occur when the migrant comes back, perhaps at the end of a job contract but intends to re-emigrate shortly[5].
5. Furthermore, permanent returns are those who settle in their home areas without the intention of emigrating again[5].

On the other hand, few authors have studied the phenomenon of return migrants' potential contribution to the development of their home regions while attempting to address the positive and negative impact of return through the cause of success or failure of the migrants. Nonetheless, these studies do not provide a consistent answer because an individual's or a society's definition of success and failure is subjective. Meanwhile, the factors that determine an individual's decision to migrate to other cities or a new country or return to their hometown may vary depending on various economic, social, cultural, and political factors. In brief, if we are to define what migration means? We shall use Everett S. Lee's (1966) definition of migration. According to Lee, 'migration is broadly a permanent or semi-permanent change of residence not characterized by the distance of the move or upon the voluntary or involuntary nature of the act.

For Lee, regardless of how short or how long, how easy or how difficult the process of migration is. Every act of migration involves factors which are the determinant behind an individual's decision to move. These factors can be summarized in association with the area of origin, the area of destination, the intervening obstacles, and personal factors. Furthermore, in every area, there are numerous factors that 'hold people within the area or attract people to it, and there are others which tend to repel them[6]'. There are sets of positive and negative reasons at both origin and destination with intervening factors for the migrants. However, it is defined differently for every migrant, and the decision to migrate is never completely rational as there is always uncertainty about the area of destination[6]. In short, this is the conceptualization behind Lee's migration theory which describes the push and pulls factors. Push factors are those which are unfavorable about the area and a determinant to leave, while pull factors are those that attracted them to the place of destination. Using this concept of Lee's migration theory, we shall examine the return of Manipur migrants from various cities in India and abroad. It will enable us to have a structured approach to the return migration of Manipuri Migrants regarding their individual experience.

Methodology

The study utilized a mixed-method approach-qualitative as well as quantitative. In the first step, quantitative data was collected from 1037 participants Manipur Society for Skill Development, Government of Manipur for July and August 2020. These participants were migrants from India as well as abroad returning to Manipur. All the 1037 participants were approached and invited to participate in the quantitative interview conducted from July to September 2020. A total of 137 participants responded to participate in the qualitative interview, out of which 56 participants were selected while maintaining the heterogeneity of age, sex, and eight sectors (Student, Tourism and Hospitality, Healthcare, IT sector, Retail, BPO, and Beauty and wellness).

Furthermore, a semi-structured in-depth interview was conducted with these 56 participants via telephone. The researchers performed the interviews and collected data until saturation was reached. The quantitative data were analyzed using IBM-SPSS, whereas the qualitative data was collected data had been analyzed using Nvivo software.

Findings

Migration is a heterogeneous phenomenon, with significant variation among migrants in terms of initial levels of education, skills, and economic background[7]. A similar situation is witnessed for returnees who have come back to Manipur due to covid-19. And their varying background is shown below:

Table 1
Percentage Distribution of the Demographic Characteristic of Return Migrants, Manipur Society Skill Development Survey, Govt. of Manipur, July-August 2020

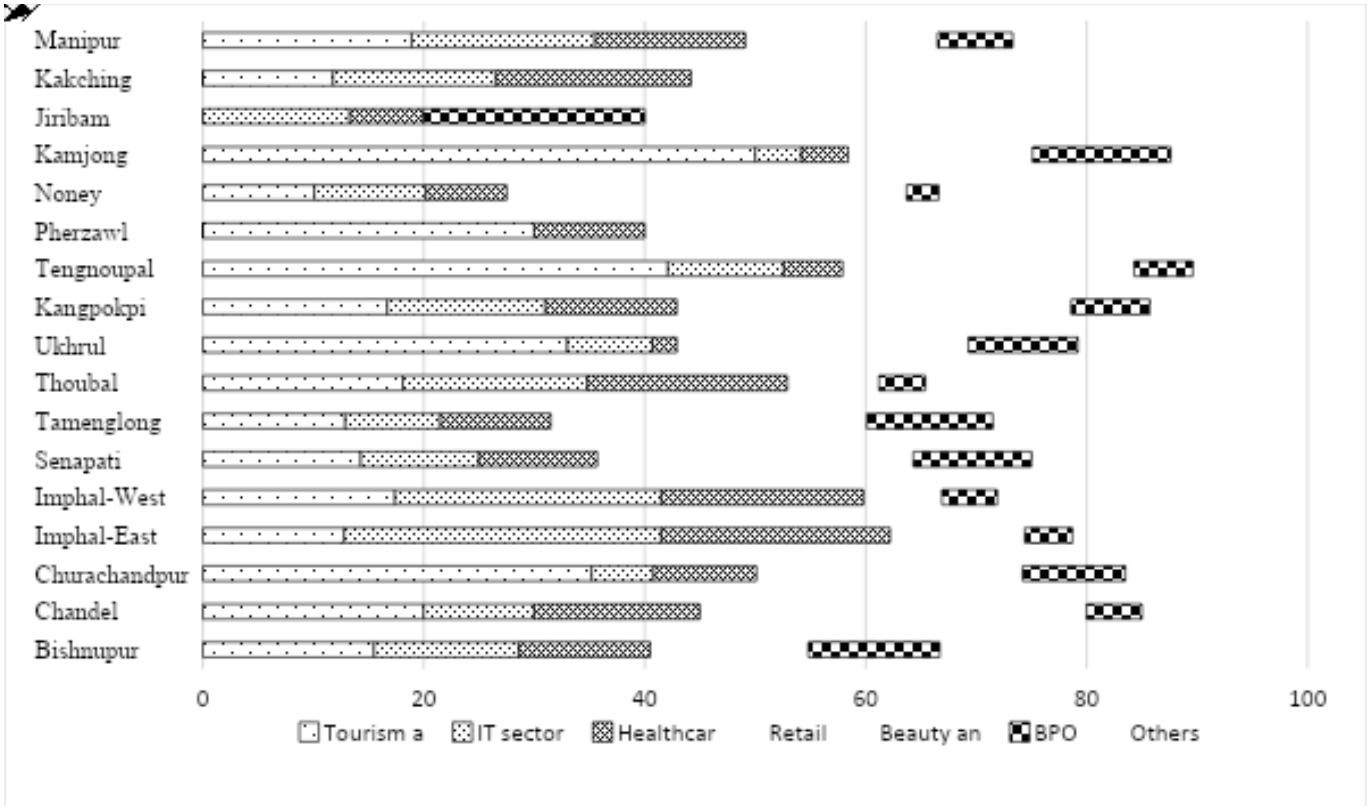
	N=1037	Percentage (%)
Residence		
Urban	314	30.2
Rural	723	69.8
Sex		
Male	629	60.7
Female	408	39.3
Age		
<20 years	105	10.1
21-25 years	365	35.2
26-30 years	317	30.6
31-35 years	159	15.3
36-40 years	64	6.2
41-45 years	21	2.0
Above 45 years	6	0.6
Education		
Class 10	106	10.2
Class 12	278	26.8
Graduation	474	45.7

Post-Graduation	179	17.3
Migrant travelled from		
India	1,012	97.7
Abroad	24	2.3
Work Sector		
Beauty and Wellness	70	6.8
healthcare	141	13.6
Tourism and Hospitality	196	18.9
IT Sector	172	16.6
Retail	110	10.6
BPO	70	6.8
Others	278	26.8
Training Received		
Yes	304	29.3
No	733	70.7
Experience		
Less than 1 year	284	27.4
Less than 2 year	203	19.6
Less than 3 year	550	53.0
After 6 months	53	5.1
Returning Plan		
No plan yet	794	76.6
After 1 months	108	10.4
After 2 months	35	3.4
After 3 months	47	4.5
After 6 months	53	5.1

The regional pattern of migration in India shows that, in general, it is the poorer and more populous states in the East and North-East, and the lagging areas within each state, that are the source of out-migration, whereas developed states in the North, West, and South, and areas within each state, are the primary recipients of migration[7]. Similarly, almost 70 per cent of the return migrants during the months of July and August are from the rural areas of Manipur because migration becomes a coping strategy against unemployment. Furthermore, states in the North, West, and South are the recipient of these migrants.

Moreover, the state of Manipur is unique in the entire North East as the outflow is three times higher than the inflow in the state[8]. Migrants from Manipur constitute an educated and young labor force employed in skilled and semi-skilled sectors. Around 45 per cent of the return migrants are graduates, 17 per cent are post-graduates, and the remaining has a high school degree. The proportion of male return migrants is more than the female return migrants, and a majority of them are between the age of 21-25 years (35%) followed by 26-20 years (30%), and 31-35 years (15%).

Figure 1
District-wise Distribution in Manipur according to the Return Migrants' Sector of Employment



The Manipuri return migrants are from tourism and hospitality (18%), IT sector (16.6%), healthcare (13.6%), and retail sale sector (10.6%). Around 70 per cent of the return migrants are trained, and 53 per cent have gained 2-3 years of experience. Seventy-six percent of the return migrants have no plan of returning.

Findings

The issue of return migration has recently gained increased attention in every discipline due to the global pandemic, which has driven thousands of migrants to return to their place of origin due to the uncertainties ahead. The concept of Lee's migration theory (Push and Pull factors) is adopted concerning the return migration to examine the impact the pandemic has had on the livelihood of the Manipuri migrants.

Push Factors

Job Loss: Migrants who have lost their jobs are insecure about their financial status due to the uncertainty of their next income source. The majority of these migrants do not have adequate savings or assets to depend on. And the nature of the organization these people work for is mainly private and consumed based (e.g., BPO, Beauty Parlors, Restaurants, Hotels) with no job guarantee. Their earnings are limited, sufficient to a bare minimum of paying housing rent, electricity and water bills, buying essential commodities, and spending for daily commute. Having migrated to the city in search of better educational and employment opportunities, they are also driven by the motive to feed their families back home or fund their siblings' education. One of the informants stated, *'Since I lost my job, I know that life is going to be very difficult in cities without a job and pay, apart from the virus.'*

Financial Challenges: Industries to incur the sudden drop and loss in business had to cut down several employees, pay cuts, or temporarily shut down. The majority of the return migrants from Manipur were employed in tourism and Hospitality, Retail, Beauty and Wellness, and BPO, which incurred maximum loss due to the unforeseen halt in business. Moreover, very few managed to save a small fraction of their income before the nationwide lockdown; the percentage of people with meager or no savings are even higher. Along with the lack of money to pay for accommodation and food, the inability to manage living expenses, pay off loans, and high EMI have caused many financial challenges and caused panic and anxiety. Many also had to deal with emotional struggles caused by ever-increasing debt and the uncertainties of the future.

Xenophobic Treatment: Similar to the rest of the world, Covid-19 is also racialized in India. Profiling people from the North-Eastern states with mongoloid features suspected as carriers of the virus and a target of xenophobia. These migrants have been victims of marginalization and discrimination, even before the pandemic. They recognize the difficulties and threat of being a minority concerning their physical appearance, ethnic identity, or religious belief. The pandemic has reinforced the constant discrimination they face in their everyday life. When asked the kinds of xenophobic treatment they received, the returnees' responses had similar narratives of verbal abuse, harassment, and discrimination. Some of the people expressed:

"I was scared of the mainland people as we do not look the same as them."

"Mainlanders calling us corona, some of them would close their nose and divert their way when seeing me coming on the opposite direction. Shopkeepers are reluctant to attend us too."

"*I became a joke in workplace because of my mongoloid look. Some started making fun saying your brother and sister are causing corona."*

Fear of Pandemic: Around some other factors stated as reasons by the informants for return is fear of the pandemic. Migrants felt insecure, accounting for fear of falling sick, paranoia, fear of being alone, and not having the support system of friends and family. Some of the people's statements are as given below:

"Since I was working at a general hospital (private company), there was a high risk of Covid infection."

"At first, the scenario was scary. I was scared that if I get the virus, I will not be able to meet my family."

"Lonely, fear of falling sick, no one to look after, I will not be able to meet last time, no relative around, feeling quite uncomfortable staying alone, living in a very depressive way under the four walls of the room."

Family Pressure: Families of the migrants who are at the place of origin understand the uncertainties resulting from the unprecedented surges in the Covid-19 cases and challenging economic situation. The risk of staying back with limited access to resources and a support system is extremely high. Therefore, the families want them to return home as the need for family reunion and support is prioritized.

Need to Vacate: Among the returnees are students, research scholars, and working professionals residing in college and university campuses, paying guests. They were asked to vacate their accommodation within short notice. The concerning authorities of these institutions and the owners of these housing facilities do not want to take additional burden of the responsibility for any unforeseen situation as the disease is contagious and resources concerning immediate health care are scarce. Some of the statements as expressed by the people are:

"I was notified to go home by campus authority."

"The hostel administration wants us out. Also, the COVID-positive cases were alarmed in Mumbai."

Pull Factors

Reduce Expenditure: Not every returnee who had come back to Manipur due to the pandemic lost their jobs or had the financial challenges that compelled their return. Instead, the determinant behind their return was to save money on rent. With the facility to work or study from home, it became an opportunity for many to be home with their families, cut down on extra expenditure, and an opportunity to save money. People expressed, *"There is no need to pay a huge sum of rent in Mumbai if there is an option to work remotely" while some stated, "The family wanted me to return home. Besides, we could work from home."*

Safety and Security: The return migrants felt that their mental and physical health was compromised due to lockdown. The majority of the respondents felt safer returning to their hometown as they were worried about the well-being of their family members and themselves. Moreover, less number of Covid-19 cases, better climate, the availability of outdoor space and activities in their hometowns was also an additional factor in their decision to return. The respondents felt safer to be home being unemployed as they have the emotional, social, and economic support of their families, relatives, and the community. People said,
"As staying far from the family in this condition, I do not feel safe, and it is very risky to stay far from the family, suppose something happens to the family or me both me and my family cannot help/reach each other as we still have a quarantine procedure. So, that is the reason I cannot seem to stay peacefully, and it is very stressful."

Family Reunion: Several studies have discussed the non-economic reasons for return migration; one reason is the family that motivates homeland return [6]. This non-economic reason stands uncontested even with migrants who have come back to Manipur due to the pandemic. It is evident from the espondents' narratives that they have maintained an active relationship with their families and acknowledge the value of family networks. Therefore, the decision to be with family and reunite became a critical aspect to make with the uncertainties of the pandemic.

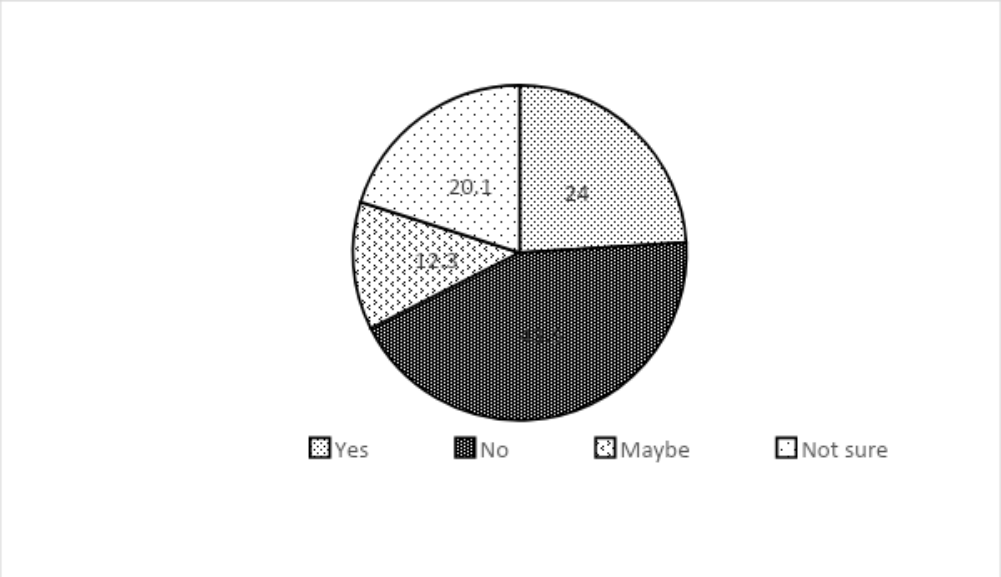
Entrepreneurial Opportunities: Migrants are aware of the business opportunities available to them in their hometown, identifying the sector, evaluating the probable potential and investment opportunities it can capitalize on. In the first place, these individuals chose to migrate out of Manipur, recognizing the requirement to build networks, learn the trade of the specific sector, and build capital to invest in the future. The pandemic became a favorable option for some to come back to Manipur, that is, to work close to home and start their entrepreneurial ventures. According to some respondents, they are looking to start their own ventures in Information Technology, health, and education sector. They told, *"I resigned from my job last month because I felt the pandemic is the perfect opportunity to be home and start my own company."*

Discussion

According to Census 2011, 25 per cent out-migration from Manipur is for work-related reasons, 12.8 per cent for education, and almost 31.4 per cent have moved with the household. However, the nationwide lockdown from 25 March 2020 has caused thousands of migrants to return to Manipur due to the covid-19 uncertainties. Without any job or the certainty of gaining employment and closing down institutions, the determinant of push factors is ranked higher than the pull factors. The benefit of staying in the city became lower for working professionals (including their family members who migrated with them) and students. While the pull factors to return seem primarily favorable in terms of family reunion and safety and security, the inability to earn and generate income has caused anxiety and panic for these migrants due to increasing expenditure and incurring debt. Subsequently, the incapacity to send remittances to their family

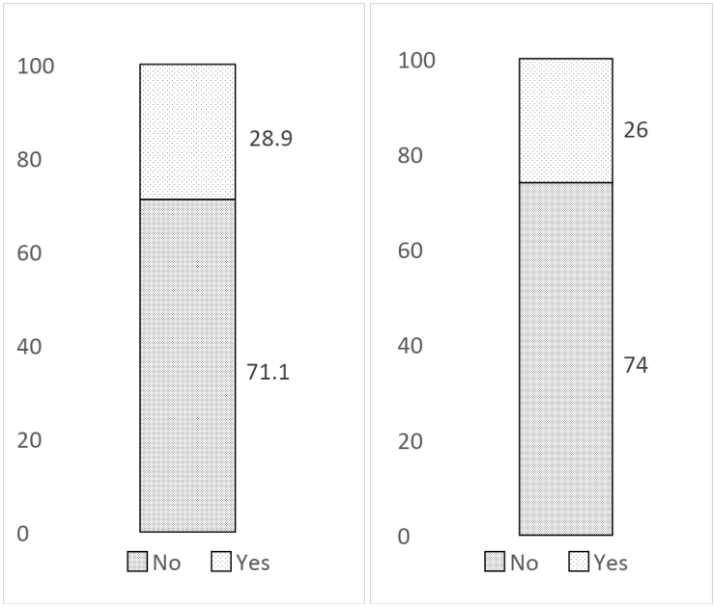
has also led to subsequent financial insecurity for the individual and their family. The remittances have helped the migrants' families rise above poverty, but they are still at the sustenance level. With the return migration, these families will not clear all their debts, build houses, and improve their living standards[9]. As shown in the Figure 2 when the respondents were asked if the current earnings of the family would be sufficient for basic sustenance, 43.5 per cent responded that the current earnings would not be sufficient. The actual percentage could be higher.

Figure 2
Are the Current Earnings of the Family Sufficient for Basic Sustenance?



As mentioned, 74 per cent of Manipuri migrants who have returned to Manipur during July-August 2020 have lost their earnings during the lockdown. The kind of employment they seek 'is based on social factors and not on the factor of the propinquity of the place of destination[9]; with 43.1 per cent of the returnees working in the semi-organized and organized sectors of the urban economy, such as beauty and wellness, tourism and hospitality, retail, and BPO. Meanwhile, 71.1 per cent of the returnees did not have any savings, while the majority amongst the remaining 28.9 per cent had savings that would last for less than three to four months. Unable to meet their living expenses and make arrangements for the return, many have borrowed money from friends and extended family to meet the need.

Figure 3
A. During the lockdown, were you still earning?
B. Did you have any savings?



A. B.

Return preparation requires time, resources, and willingness on the part of the migrant[4]. Pierre Cassarino writes on two kinds of categories about resource mobilization and the returnees' preparedness. The first category refers to returnees whose level of preparedness allows them to organize their return automatically while mobilizing the resources needed to secure their return[4]. Evaluate the cost and benefits of return considering the changes in their home state. Unfortunately, the number of returnees who fall under the first category is less. Only a few who have the social and economic capital could evaluate their return and manage to mobilize the resources to return without borrowing money and vacating their accommodation. The second category includes returnees having a low level of preparedness, as the opportunities for social and professional advancement in their place of destination are disrupted. Their migration objectives could not be achieved as planned[4]. The majority of returnees fall under this category, as the disruption caused due to the pandemic was unforeseen and sudden. The immediate objective is to return to Manipur with whatever possibilities and resources available to fulfill it. Furthermore, evaluate the cost and benefits of return after their return to their place of origin.

Conclusion

Since the mid-2000s, more migrants have been leaving the northeast than ever before, yet migration research is scarce[3]. Similarly, there is a chronic lack of information about emigrants who have returned home-their motives for returning, their precise geographical destinations, their income and employment characteristics, their new social status, mobility, aspirations, satisfaction levels, and satisfaction reintegration[5]. Every state has different social, cultural, economic, and political factors determining individuals' and families' decisions to migrate. There is a desperate need for a comprehensive and inclusive study to understand and analyze the trends and reasons for out-migration and return migration, even in Manipur. Such studies would benefit the Government and civil society organizations to address issues on migration and its sustainability. Well-planned state-based policies will effectively meet adequate long-term

functioning, significantly when an unforeseeable situation like the COVID-19 pandemic has crippled workers in varied sectors of the industry with the already exhausted job market.

As mentioned in the paper, all the returnees have a high school degree, and 45.7 per cent with a Bachelor's degree. The migrant population from Manipur is an educated population, with a high number employed in the service sector, such as BPO, retail, tourism and hospitality, and beauty and wellness. They have received vocational training and career counseling from Government and private agencies in skills that make them eligible to build a career in these sectors, without a good backup of the primary and secondary sectors. The COVID-19 pandemic is a reality check for the Government of Manipur and the people, showing the plight of not having a sound economic base of the primary and secondary sector. And invest in developing a sustainable system of income generation and self-reliance.

Unfortunately, Manipur does not have the employment capacity to absorb the large quantum of return migrants who have returned due to the COVID-19 pandemic with its already burdening high unemployment rate. However, as Lusome and Bhagat (2020) write, the massive inflow of return migrants to the North-Eastern states has challenged the state governments yet offers a window of opportunity to capitalize on the skills and experience of the returned migrants[8]. Therefore, despite the severe disadvantage caused on the livelihoods of many due to return migration, the pandemic is an opportunity, i.e., 'brain gain' to capitalize on new ideas and opportunities by returnees and shifting on the need for up-skilling and focusing on our indigenous skills and knowledge, which would sustain the population's livelihood in the long-run. There is an urgency to stop complete dependency on employment agencies, such as salaried jobs provided by the state government or large private enterprises. Instead, educate and integrate the disposition of dignity of labor, and encourage self-employment.

Conductively, policy-makers have raised varied questions on how we can build a resilient society in the post-pandemic. Firstly, regarding the kind of jobs that should be created for local economies to sustain in the long run. Secondly, whether out-migration is sustainable for the development of the state, out-migration reduces unemployment in the state. However, it also indicates brain drain. Thirdly, the issue of finances is prevalent as the maximum population in the state has a high dependency on the State Government for employment and funding facilities. Therefore, how can be these issues addressed?

a) Micro, Small, and Medium Enterprises in Manipur are growing faster, with more than 31000 units are registered in the state and highest in the North-Eastern region between 2015 and 2019. However, to be effective and efficient, MSMEs require access to financial strength, access to technology, trained workers, and access to a global market. However, due to lack of adequate and timely credit, high cost of credit, lack of collateral requirements, limited access to equity capital, industrial work culture, and skilled labor, MSMEs and Startups in Manipur are unable to attend sustainable growth in terms of the potential it possesses.

b) The future concerns are on the security of jobs, access to adequate health services, education, and self-reliance. Many return migrants want the Government to focus more on agriculture, market linkages, health services, and education reforms, which would prepare them for any further shock.

c) The state can take the opportunity for the reintegration of the return population. They have the educational qualification and training required to expand and boom entrepreneurship in the state. It can be carried through agricultural innovation, social entrepreneurship, improved digital

infrastructure and system to ensure better network connectivity, and an accessible and improved banking system.

d) The study on migration is fragmentary, especially concerning return migration. However, the benefit of reintegrating the return pool of the population is recognized by policy-makers. Documenting the skills, aspirations, and patterns of out-migration and return migration is inevitable. Before the pandemic, there was insufficient data on people who have left the state. Therefore, it was intractable for both private and Governmental agencies to recognize the characteristics of the returnees and draft a short-term solution to accommodate their needs.

e) Lastly, return migration can become a positive strategy of livelihood and an opportunity to build a resilient labor market. On the same note, the need to scale up social protection was evident during the Covid-19 pandemic as we witnessed how each country in the World relied on its existing social protection systems to cope with the shock.

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