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IMPACT OF HEALTH DIMENSION ON GENDER INEQUALITY INDEX OF AHMEDABAD DISTRICT

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ABSTRACT

The present study has been carried out to identify the level of gender Inequality by computing Gender Inequality Index for 10 Talukas of Ahmedabad District. The main source information, statistics has been the secondary data. Performance of 10 Talukas of Ahmedabad District has been measured with the three dimensions of Gender Inequality Index, such as Reproductive Health, Empowerment and labour market. Further, impact of Health Dimension on Gender Inequality Index has been analysed by using simple and linear regression model. This model has included health indicators such as MMR, AFR. Evaluation, which has led to the choice of relevant hypotheses, which have been based on a series of tests using relevant statistics like standard error tests t-test of estimated coefficients, F- statistics and their probabilities, coefficient of determination and Durbin-Watson statistics. Results showed that Barwala Taluka has had minimum gender inequality while Viramgam Taluka has had maximum Gender Inequality among the selected Talukas of Ahmedabad District. Strong positive correlation has been found between indicators of reproductive health (MMR and AFR), MMR (Maternal Mortality Rate) and AFR (Adolescent Fertility Rate) have been statistically significant ($p<0.01$) and highly significant ($p<0.05$). From the magnitude of the t-statistics, it has been found that AFR had more impact than MMR.

KEYWORDS: *Adolescent Fertility Rate, Gender Inequality Index, Health Dimension, Mortality Rate.*

Introduction

R. Kumar (2011)[1] is of the view "Gender equity is the process of being fair to women and men. To ensure fairness measures must often be available to compensate for historical and social disadvantages that prevent women and men from otherwise operating on a level playing field, measures that will empower women and achieve political, social, economic, cultural and environmental security (OECD, 1998)" Human development requires equal weightage to both males and females. In case of our country where female suffers in comparison to males resulting in gender inequalities in the society, requires more importance to be paid for women and their development everywhere. To measure gender disparities in various fields, UNDP formulated two measures - Gender Development Index and Gender Empowerment Measures in 1995 Human Development Report. Due to various limitation of the gender development index and gender empowerment measure to measure gender disparity, UNDP introduced new gender index, known as Gender Inequality Index (GII) in 2010 Human Development Report. The GII compares the situation of women and men between countries and also may be adapted to national realities by applying the same functional form in the following three dimensions and five indicators.

Gender Inequality Index	
Dimensions	**Indicators**
Reproductive health	• Adolescent rate • Maternal mortality
Empowerment	• Educational attainment (secondary level and above) • Parliamentary representation
Labour market	• Labour force participation

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1 Found on Kumar, R. (2011). Women empowerment a key to development.p-27

To serve the purpose of the research problem relating to inequality in case of women, Ahmedabad district has been selected with a view point objects of the study. For research purposes the delimited area is a must to study the problem in depth. After studying existing related literature available in the library and reviewed articles, published data, various human development reports published by UNDP as international framework and nationally by planning commission and knowledgeable discussion have been used for the research problem. Thus, scientific approach is followed in this study. This present study has been carried out to find out the gender inequality index for measuring gender inequalities in 10 talukas of Ahmedabad District. Further it examines the impact of health indicators on Gender Inequality Index of 10 Talukas of Ahmedabad District. The present study focuses on development of Gender Inequality Index in Introduction, followed by related literature review, Research Methodology, Results and Findings, Conclusion and Suggestions.

Literature Review

GDI and GEM indices for measuring gender inequality had been criticized for their conceptual and methodological limitations. Regarding income variable which measures the female participation in the economically active population and on the female/male urban wage, **(Dijkstra, 2000, p.9)**[1]. **Chant (2006, p.210)**[2] examined that the income variable in both GDI and GEM was restricted to formal sector remuneration. Consequently, the actual distribution of incomes at household, rural wages and informal sector wages tends to be excluded from the measurements. It clarifies that the measure did not include the poor women who were concentrated in unpaid household labour and subsistence farming.

Jong in Kim and Gukbin Kim (2014) in their study on **'labour force participation and secondary education of gender inequality index (GII) associated with healthy life expectancy (HLE) at birth'** estimated the associations between population at least secondary education with ages 25 and older (PLSE), labour force participation rate with ages 15 and older, of the GII (Gender Inequality Index) and healthy life expectancy (HLE). The data for the analysis of HLE in 148 countries were obtained from the World Health Organization. Information regarding the GII indicators for this study was obtained from the United Nations database. Associations between these factors and HLE were assessed using Pearson correlation coefficients and regression models. They found that although significant negative correlations were found between HLE and the LFPR, positive correlations were found between HLE and PLSE. Finally, the HLE predictors were used to form a model of the components of the GII, with higher PLSE as secondary education and lower LFPR as labour force (R 2 = 0.552, P <0.001). They concluded that Gender inequality of the attainment secondary education and labour force participation seems to have an important latent effect on healthy life expectancy at birth. Therefore, in populations with high HLE, the gender inequalities in HLE are smaller because of a combination of a larger secondary education advantage and a smaller labour force disadvantage in male-females.[3]**Quentin J. Mark, (2013)** in his article on **"global variance in female population height: the influence of education, income, human development, life expectancy, mortality and gender inequality in 96 nations"** indicated that human height was a heritable trait that was known to be influenced by environmental factors and general standard of living. Individual and population stature was correlated with health, education and economic achievement. Strong sexual selection pressures for stature have been observed in multiple diverse populations, however; there was significant global variance in gender equality and prohibitions on female mate selection. He had explored the contribution of general standard of living and gender inequality to the variance in global female population heights in his article. Results indicated that population heights vary more closely with gender inequality than with population health, income and education.[4]**D. Narayana (2008)** in his paper on 'Intensifying Infant Mortality Inequality in India and a Reversal by Policy intervention' analyzed trends in mortality inequality at the infant stage, in the rural and urban areas of 15 major Indian states revealed that overall mortality inequality has intensified. This was particularly the case in the developed states, accounting for a large

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1 Dijkstra A. G. & Hanmer L. C. (2000): Measuring Socio-Economic GENDER Inequality: Toward an Alternative to the UNDP Gender-Related Development Index, Feminist Economics

2 Chant, S (2006): Re-thinking the ''Feminization of Poverty'' in Relation to Aggregate Gender Indices, Journal of Human Development, Vol. 7, No. 2, July 2006, pp. 201-220.

3 Kim and Kim: Labor force participation and secondary education of gender inequality index (GII) associated with healthy life expectancy (HLE) at birth. International Journal for Equity in Health 2014 13:106.

4 Mark, Q. J.(2014). Global variance in female population height: the influence of education, income, human development, life expectancy, mortality and gender inequality in 96 nations. J Biosoc Sci. 2014 Jan;46(1):107-21. doi: 10.1017/S0021932013000175. Epub 2013 Apr 2

proportion of the foregone reduction in the infant mortality rate. However, the trend in Tamil Nadu state points to a reversal in mortality inequality in recent years on account of multi-pronged policy interventions by the state government, which was aimed at protecting the girl child. The political-will of the party in power during 1991–1996 and 2001–2006 in Tamil Nadu points the way for the rest of the nation, and was possibly the way for India to achieve the Millennium Development Goal with respect to the infant mortality rate. India reported a low reduction in the IMR, which was significantly lower than that reported by Bangladesh or Sri Lanka, contributed by two distinct factors. Low reduction in most of the poorer states was linked to low female literacy, low women's empowerment and lack of access to healthcare services. And low reduction in many of the developed states was largely owing to the mortality inequality among infants. The mortality inequality that was, the higher mortality among female infants relative to males had been intensifying in the urban areas as well. Urbanization, instead of dissolving the biases and regressive social practices, was leading to an intensification of mortality inequality in India. Hence, attaining the Millennium Development Goal with respect to the reduction of the IMR appeared to be unlikely if the focus was on initiatives at the level of the health sector. Furthermore, development of the poorer states was also not going to solve the problem as development has led to intensification of mortality inequality. A societal-level initiative of the Tamil Nadu type might help in changing the course and the nucleus of it exists in almost all the states. For instance, Maharashtra, which reported intensification of mortality inequality, has about 7% of all SHGs linked to banks in India, and a bonding of women of the type developed in Tamil Nadu could change the trends in that state. What it calls for was the necessary sensitivity and political will.[1] **Mavalankar, D., Vora, K., Ramani, K., Raman P., Sharma, B., & Upadhyaya, M (2009)** described that progress in reducing maternal mortality has been slow and largely unmeasured or documented and this study they identified several challenges for reducing the maternal mortality ratio, comprising lack of managerial capacity, shortage of skilled human resourced, non-availability of blood in rural areas and infrastructural and supply bottlenecks. They have made recommendation for expanding the management capacity for maternal health, operationalization of health facilities and ensuring availability of blood and improving the registration and auditing of all maternal deaths.[2]

Akash Acharya, & M. Kent Ranson (2005) in their article on 'health care financing for the poor community-based health insurance schemes in Gujarat studied that CBHI works as a promising alternative for financing health care expenditure. They had classified their article in six sections. In the first section they reviewed literature; in second section they briefly explained the burden of health care expenditure on the poor and the inability of state and market to protect them from this burden. Section three discussed a working definition of CBHI and explained how it differed from standard health insurance. Section 4 narrated the role of the state, market and NGOs in Gujarat that were running health insurance schemes. Finally, in section 6th they compared and evaluated strengths and weaknesses of these schemes.[3]

After reviewing the related literature, the present study is carried out for the research work. Though various researches have been done in relation to many aspects of gender discrimination. Many researchers have constructed and criticized many different indices which measures gender inequality between females and males for obtaining accurate picture in relation to loss of human development.However, no study has been carried out to examine impact of health dimension on Gender Inequality Index of Ahmedabad District. Hence, the present study has been carried out with the following objectives:

Objectives

- To explore about Gender Inequality Index of Ahmedabad District
- To examine impact of health dimension on Gender Inequality Index of Ahmedabad District

Research Methodology

With a view to conducting the present research work titled "Impact of health dimension on Gender Inequality Index of Ahmedabad District", the following research methodology has been used to realize the objectives and analyse impact of health dimension indicators such as MMR and AFR on Gender Inequality Index.

[1] Narayana, D. (2008). Intensifying infant mortality inequality in India and a reversal by policy intervention. Journal of Human Development, 9(2), 265-281.

[2] Mavalankar, D. V., Vora, K. S., Ramani, K. V., Raman, P., Sharma, B., & Upadhyaya, M. (2009). Maternal health in Gujarat, India: a case study. Journal of Health, Population and Nutrition, 235-248.

[3] Acharya, A., & Ranson, M. K. (2005). Health care financing for the poor: community-based health insurance schemes in Gujarat. Economic and Political Weekly, 4141-4150.

Scope and Coverage

The present study has been carried out at micro level.As no study has been carried out to determine the impactof health dimension on Gender Inequality Index in rural region of Ahmedabad District, the present research study has been carried out by selecting all 10 Talukas representing rural Ahmedabad namely Daskroi, Sanand, Bavla, Dholka, Viramgam, Mandal, Detroj-Rampura, Dhandhuka, Ranpur, Barwala.For the measurement of gender inequalities, the Gender Inequality Index has been computed as presented in HDR. Statistics in the area of healthhave been taken to analyse as a part of impact of health indicators, 'MMR and AFR' on Gender Inequality Index of Ahmedabad district.

Collection of Data

The present study has been based on secondary data which have been collected mostly from the Ahmedabad Jilla Panchayat, offices and websites of the Gujarat government and from the CENSUS-2011 Gujarat.

Data Analysis and Interpretation

To serve the purpose of the objectives of the present study, the calculationsand tables have been used to analyse the aspects of study along with thepresentation of results.Gender Inequality Index dimensions have been computed, Gender Inequality Index have been computed and Impact of health dimensions on GII have been measured.The Gender Inequality Index has been based on the General Mean of General Means of different orders. The combination of means, the Harmonic Mean of Geometric Means, makes the GII to be both distribution and association – sensitive, basically meaning that the GII seizures the inequality between females and males and is sensitive to change in association between indicators. It fines more those Talukas where one gender performs badly on all the indicators. This has been attained by first aggregating by the geometric mean across dimensions separately for males and females then by aggregating by the harmonic mean across genders. This method has been summarised here in terms of five steps.

Step-1 treatment of zeroes and extreme values

Two of the indicators require adjustment for the computation of the index.

The Reproductive health indicators used in the Gender Inequality Index do not have equivalent indicators for males. Therefore, in this dimension, the reproductive health of girls and women is compared to assume norms of no maternal death, and no adolescent pregnancy.

Step-2 aggregating across dimensions within each gender group, using geometric means

Aggregating first across dimensions for males and females by the geometric mean makes the GII association sensitive.

For females, the following formula is used for aggregating.

$$G_F = \sqrt[3]{\left(\frac{1}{MMR}\cdot\frac{1}{AFR}\right)^{1/2}\cdot(PR_F\cdot SE_F)^{1/2}\cdot LFPR_F}\ ,$$

$$G_M = \sqrt[3]{1\cdot(PR_M\cdot SE_M)^{1/2}\cdot LFPR_M}\ .$$

And for males

Step 3 aggregating across gender groups, using a harmonic mean

$$HARM(G_F, G_M) = \left[\frac{(G_F)^{-1}+(G_M)^{-1}}{2}\right]^{-1}.$$

The female and male indices are aggregated by the harmonic mean which is as follows:

This Harmonic mean of geometric means within groups seizures the inequality between females and males and accounts for association or overlap across dimensions.

Step 4 calculating the geometric mean of arithmetic means for each indicator.

The standard for computation of inequality is achieved by aggregating female and male indices using equal weights and then aggregating the indices across dimensions.

$$G_{\overline{F},\overline{M}} = \sqrt[3]{\overline{Health} \cdot \overline{Empowerment} \cdot \overline{LFPR}}$$

where $\overline{Health} = \left(\sqrt{\frac{1}{MMR} \cdot \frac{1}{AFR}} + 1\right)/2$, $\overline{Empowerment} = \left(\sqrt{PR_F \cdot SE_F} + \sqrt{PR_M \cdot SE_M}\right)/2$, and

$$\overline{LFPR} = \frac{LFPR_F + LFPR_M}{2}.$$

It should be noted that Health should not be interpreted as an average of corresponding female and male indices but as half the distance from the norms established for the reproductive health indicators- fewer maternal death and fewer adolescent pregnancies.

Step-5 calculating the gender inequality index

$$1 - \frac{Harm(G_F, G_M)}{G_{\overline{F},\overline{M}}},$$

Comparing the equally distributed gender index to the reference standard yields the Gender Inequality Index, It ranges from 0 to 1. The Zero indicates that there is no gender inequality across dimensions. Similarly, 1 indicates total gender inequality across dimensions.

Research Hypothesis

H_O: There is no significant impact of Reproductive health indicators (MMR and AFR) on gender inequality index (GII).

H_1: There is significant impact of Reproductive health indicators (MMR and AFR) on gender inequality index (GII).

For hypothesis testing, simple and linear regression model has been specified. This model has contained health indicators such as MMR, AFR. Evaluation, which has led to the choice of relevant hypothesis, which have been based on a series of tests using relevant statistics like standard error tests t-test of estimated coefficients, F- statistics and their probabilities, coefficient of determination and Durbin-Watson statistics.

Results

Based on literature review, reproductive health dimension has been consisting of MMR and AFR. With a view to determine the impact of Reproductive health indicators (MMR and AFR) on gender inequality index (GII), MMR and AFR and GII have been computed for the selected Talukas and have been summarized in Table 1.

Table 1: Health Indicators and GII

Sr.No	Talukas	MMR	AFR	GII
1	Mandal	52	5.49	0.416
2	Detroj-Rampura	136	3.85	0.47
3	Viramgam	120	7.96	0.537
4	Sanand	46	5.34	0.447
5	Daskroi	72	6.14	0.506
6	Dholka	95	8.5	0.51
7	Bavla	177	6.87	0.514
8	Ranpur	47	4.41	0.416
9	Barwala	124	1.21	0.375
10	Dhandhuka	76	4.3	0.43

Source: Computed by Researcher

With a view to determine the impact of Reproductive health indicators (MMR and AFR) on gender inequality index (GII), model have been specified wherein Reproductive health indicators have been regressed on Gender Inequality Index.

$$\mathbf{Y = b_0 + b_1X_1 + b_2X_2}$$

Where,

Y = GII X_1 = Maternal Mortality Rate X_2 = Infant Mortality Rate

As described in Table 2, the model summary has contained two models. Model 1 refers to the first stage in the regression when only MMR has been used as a predictor. Model 2 refers to the final model where in both MMR and AFR have been used as predictors. R shows the values of the multiple correlation coefficients between the predictors and the outcome. When only MMR is used as a predictor, this shows correlation between MMR and GII (0.401)R^2 shows how much of the variability in the outcome is accounted for by the predictors. For the model 1, its value is 0.161 which means that MMR accounts for 16.1 percent of the variation in GII. However, for the final model (model 2), this value increases to 0.857 or 85.7 percent of the variance in GII. Therefore, AFR variable entered in block 2 account for an extra (85.7-16.1) 69.6 percent of the variance in GII scores. It has been shown in the column labelled R-square change.The adjusted R^2 indicates how well model generalizes and ideally, its value to be the same, or very close to, the value of R^2. In the above mentioned table difference for the final model is a fair bit (0.857 – 0.816 or 4.1 percent). This shrinkage means that if the model were derived from the population rather than a sample it would account for approximately 4.1 percent less variance in the outcome. Durbin- Watson statistics 1.955 which is so close to 2 indicates no auto correlation between independent variables errors.

Table 2 - Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.401[a]	0.161	0.056	0.051898	0.161	1.535	1	8	0.25	
2	.926[b]	0.857	0.816	0.022893	0.696	34.112	1	7	0.001	1.955

a. Predictors: (Constant), MMR ;

b. Predictors: (Constant), MMR, AFR

c. Dependent Variable: GI

Source: Computed by Researcher

From Table 3, it can be seen that An analysis of variance (ANOVA) tests whether the model has been significantly better at predicting the outcome than using the mean as a 'best guess'. F- Ratio has revealed the ratio of the improvement in prediction that results from fitting the model (labelled 'regression' in the table), relative to the inaccuracy that still exists in the model (labelled 'residual' in the table). This table has again been splitinto two sections: one for each model. For the initial model F-Ratio has been 1.54, and p value has been 0.25, which has showed that MMR has no significant impact on GII at 5 percent level of significance. For the second model, group of MMR variable and AFR variable, the value of F-Ratio has been 21 percent, which has showed significant ($p < 0.01$) and highly significant ($p < 0.05$) impact.

Table 3: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.004	1	0.004	1.535	.250[b]
	Residual	0.022	8	0.003		
	Total	0.026	9			
2	Regression	0.022	2	0.011	21.001	.001[c]
	Residual	0.004	7	0.001		
	Total	0.026	9			

a. Dependent Variable: GII

b. Predictors: (Constant), MMR

c. Predictors: (Constant), MMR, AFR

Source: Computed by Researcher

Table 4 focuses on the parameters of the model. The first step in present study model has included MMR and although these parameters have been interesting up to a point, the final model has contained all predictors that has made a significant contribution to study impact on GII.

Table 4: Parameter

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations		
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	0.416	0.041		10.212	0	0.322	0.51			
	MMR	0	0	0.401	1.239	0.25	0	0.001	0.401	0.401	0.401
2	(Constant)	0.309	0.026		12.005	0	0.248	0.369			
	MMR	0	0	0.352	2.458	0.044	0	0.001	0.401	0.681	0.351
	AFR	0.021	0.004	0.836	5.841	0.001	0.012	0.029	0.857	0.911	0.834

a. Dependent Variable: GII

Source: Computed by Researcher

This model has contained a coefficient (b) for each predictor. Hence, Multiple regression model equation can be written as follows from the above mentioned table values.

$$\mathbf{Y = b_0 + b_1X_1 + b_2X_2}$$

GII predicted= (0.309) + 0*mmr+ 0.021*afr

The b value shows the relationship between GII and health indicators (each predictor). Model indicates positive relationship between the health indicators and GII. MMR coefficient is zero, which shows there will be no change in GII by its. The coefficient for AFR is 0.021, which indicates for every unit increase in AFR, a 0.21unit increase in GII predicted. Each of these beta values has an associated standard error indicating to what extent these values would vary across different samples, and these standard errors are used to determine whether or not the b values differs significantly from zero. Therefore, t-test associated with a b values is significant. For this model, the coefficient for MMR 0.00, $t = 2.46$, is statistically significantly different from zero using $p < 0.05$ because its p value is 0.04and the coefficient for AFR (0.21), t= 5.84, is statistically significant because its p value of 0.001, ($p<0.05$). Thus, MMR and AFR are significant predictors of GII. From the magnitude of the t-statistics AFR has more impact than MMR. It can be seen that there has been significant impact of Reproductive health indicators (MMR and AFR) on gender inequality index (GII) in selected Talukas of Ahmedabad District. Hence, Null hypothesis has been rejected and alternate hypothesis has been accepted.

Findings and Conclusion

Gender Inequality Index of Ahmedabad District has been calculated 58 percent which implies that poor performance of women and less development of female in comparison to male achieving human development goals. At Taluka level Study, Barwala taluka stands first for having less gender inequality index with the score 0.38, which implies 38 percent gender discrimination while Viramgam Taluka stands last for having highest gender inequality with the score 0.54, which implies 54 percent gender discrimination. So, it is clear that Viramgam Taluka requires more attention to reduce this gender gap and to achieve equal human development.

Further, the comparative study of Talukas of Ahmedabad district on the basis gender inequality index Mandal and Ranpur are at the 2^{nd} and 3^{rd} place respectively having 42 percent gender inequality, Dhandhuka is at the 4^{th} place with having43 percent gender inequality, Sanand is at the 5^{th} place with GII 45 percent, Detroj- Rampura is at the 6^{th} place with having 47 percent gender inequality , Daskroi is at 7^{th} place with having 51 percent gender inequality, Dholka is at the 8^{th} place with having 51 percent gender inequality, Bavla is at 9^{th} place with having 51percent, The GII score ranges from 0.382- 0.54. It is an indication that for the minimization of the inequality of the females in the district. They require support in the relative directions the made available to the females in general and in larger form in rural than in urban areas.

By analysing the impact of health dimension on GII of 10 Talukas of Ahmedabad District, it can be concluded thatthere has been strong positive (0.926) correlation between indicators of reproductive health (MMR and AFR) and GII. It can also be concluded that the co-efficient (b value) of MMR and AFR are found 0 (zero) and 0.021 respectively which indicates MMR will have no effect on GII as per the estimation because its b value is zero and for every unit increase in AFR, a 0.021 unit increase in GII.It implies that Reproductive Health indicators such as MMR (Maternal Mortality Rate) and AFR (Adolescent Fertility Rate) have been statistically significant ($p<0.01$) and highly significant ($p<0.05$) and hence From the magnitude of the t-statistics AFR had more impact than MMR. It can be seen that there has been significant impact of Reproductive health indicators (MMR and AFR) on gender inequality index (GII) in selected Talukas of Ahmedabad District.

Suggestions

- To reduce maternal mortality rate, health providers must be accomplished in emergency obstetric care and health centres. The clinics must have surgical supplies to handle complications at district level as well as taluka level.
- Administrative health committee should evaluate and monitor maternal and child health issues and policies regularly.
- Maternal health care systems must be strengthened from bottom to top. The health providers in the birth clinics be educated and mobilized to perform their relating to the improved deliveries therein.
- Government should also give incentives to health providers to motivate them to do their job effectively and efficiently. Women should have easy access to skilled care before, during and after they give birth.

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