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IMPACT OF IMMUNIZATION AND FEMALE EMPLOYMENT ON INFANT MORTALITY RATE: AN ANALYSIS FROM DEVELOPING COUNTRIES

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ABSTRACT

Health makes many contributions to attaining economic growth and sustainable development. Numerous efforts have been made to improve the children's health status in the nations of the world. However, developing economies are still helpless in alleviating or decreasing to a great extent the infant's death. We have identified the contribution of key factors such as females' employment, immunization, availability of safe drinking water facilities, and economic growth in lessening the infant mortality rate in nine developing economies from 2000 to 2020. The fixed effect result reveals the infant mortality rate has decreased due to females' employment, immunization, and provision of safe drinking water facilities. Moreover, economic growth also contributes positively to decreasing infant deaths in the concerned economies. The study results recommend more earning and investment chances for making better the living standards of the communities and children's health status. Moreover, the Government must play its part in decreasing the infant' mortality rate by providing basic facilities to the general public in these economies.

Keywords: Female employment; Economic growth; Infants' mortality; Developing economies.
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INTRODUCTION

The infant mortality rate has remained a multi-faceted issue among policymakers. Diverse socioeconomic variables are well-thought-out and accountable for the high infant mortality rate in emerging economies. The inadequate provision of fundamental health services and resources because of ecological and communal obstacles like poverty, and lack of services in rural regions contributed enormously to amplified infant mortality. At the global level, approximately 99% of the occurrence of infant deaths occurred in poor or underdeveloped nations, and 86% of these deaths were the result of contaminations, premature births, problems in the course of delivery, and pre-natal suffocation and birth grievances (Andrews et al., 2008). There have been observed so many causes for the infant mortality rate. Though issues like the mother's schooling, ecological circumstances, and the political and medical substructure of a nation contributed too to infant mortality (Genowska et al., 2015), the development in sanitation, approach towards uncontaminated drinking water, immunization against communicable illnesses, and extra community health actions assisted in lessening high infant mortality rates.

The infant mortality rate is in general delineated as the number of mortalities amongst children within the first year of their birth for each one thousand live births in the assumed year (Reidpath & Allotey, 2003). Infant mortality rate is a complex factor that is, in a straight line or circuitously, prejudiced by numerous variables. The possibility of survival is much greater in for grown-ups and ageing persons than infants as their resistance structure is not well established which makes them vulnerable to diseases and they are

not industrialized adequate to deal with the outward fluctuations. Because of this, issues like the status of healthcare services, living standard of the instant family, having a nourishing diet, and appropriate hygiene amenities have a main influence on the infant mortality rate. As said by Klinger (1985), infant deaths are the main amount of deaths in emerging states in contradiction of industrialized countries, where it results in a comparatively lesser amount of total demises.

The developing nations performed scantily in making less the children deaths. Acceptable and capable community health expenditures on workforce and transportation are widely considered unsurprising to recovering the child health position and infant mortality. World Health Organization evaluates that as regards six million children died in the previous year (WHO, 2014). The bulk of them were from emerging economies and lag behind economies of MDG-4 like Caucasus and Central Asian, Southern Asian, and Sub-Saharan African countries. Child health, especially, infectious diseases and undernourishment add much to child mortality (Lopez et al., 2006; Black et al., 2008; Gutbrod et al., 2000). Numerous communicable diseases can be forbidden, and malnutrition can be made less by extensive and justified health coverage.

These studies also ignored the role of ecological footprint consumption, access to sanitation facilities, and gross fixed capital formation in Asian economies. Numerous studies have ignored the role of women's employment and basic facilities provision in child mortality in different nations. However, we have investigated an association between females' employment, immunization, economic growth, and the provision of safe drinking water facilities with infants' deaths in developing nations.

Barenberg et al. (2015) investigated the health expenditure on infant mortality by using data from 1984 to 2012 in India. The result showed that infant mortality was reduced by increasing health expenditure, female education, and urban population. Similarly, Nikoloski and Amendah (2017) also checked the role of government spending on infant mortality in 14 economies of Africa. They used data from 2002 to 2004. It was found that immortality rates and life expectancy were lessened because of much spending. By using data from 1973 to 2000 in OECD economies, Kim and Lane (2013) found a negative association between public health spending and infant mortality rate and life expectancy. Anyanwu and Erhijakpor (2009) used data of 47 African economies from 1999 to 2004 and examined how public spending affected infant and under mortality rates. The regression result showed a negative link between government spending and infant and under-mortality rates. David (2018) focused on the role of public health expenditure on the infant mortality rate in Nigeria by using data from 1980 to 2016. The study result showed that infant mortality government health expenditure and immunization are negatively associated.

Health is important for the prosperity of the general public. Oluwaseun (2020) highlighted how government health expenditures influenced the infant mortality rate in Nigeria. The data for the analysis was used from 1991 to 2008. The regression result showed that immunization and female literacy rates tended to decrease the infant mortality rate. The study recommends more education and health care for children in society. In Africa, Akinlo and Sulola (2019) found the share of health spending by the government influenced the under-five and infant mortality. The regression result showed that GDP per capita, health aid, HIV prevalence, and immunization led to reducing the under-five and infant mortality rates. Kiross et al. (2020) analyzed the effect of healthcare expenditure on infant mortality in sub-Saharan Africa by using data from 2000 to 2015. The random effect result showed that government and external healthcare spending led to a reduction the infant and neonatal mortality.

Dutta et al. (2020) used data from 2000–2016 in SARRC countries to analyze the key drivers of infant mortality rate. The findings revealed that health expenditure, economic growth, female education, and sanitation services affected negatively the infant mortality rate. By using data from 1980 to 2022, Eltayib et al. (2022) checked factors affecting infant mortality. The regression result showed that social status, the health sector, and the wealth of an economy decreased infant mortality in Oman. Focusing on the significance of infant mortality, Passarelli-Araujo (2024) used data from 2000 to 2009 and examined that socio-economic variables led to reduced infant mortality in Latin America. Popescu et al. (2024) also

investigated the determinants of infant mortality in Eastern Europe by using data from 1993 to 2022. The result pointed out that health expenditure and education have lessened the infant mortality rate in Eastern European nations. However, ecological footprint, industrialization, and unemployment led to an increase in the infant mortality rate. The study suggested higher education to reduce mortality.

The objective of the study is to highlight the influence of female employment rate and economic growth with immunization and provision of safe drinking water supply on infants' mortality rate in developing economies.

METHODOLOGY

A link between infant mortality rate and immunization, female employment, safe drinking water facilities, and economic growth has been analyzed among 9 developing nations. The authors have used data from 2000 to 2020 for analysis purposes. The information was taken from countries like Bangladesh, India, Indonesia, Malaysia, Pakistan, Sri Lanka, Philippines, Iran and China. All data information was drawn from the World Development Indicator.

Model Specification

A recent study has investigated the impact of immunization, female employment, safe drinking water facilities, and economic growth on infants mortality rates in some chosen developing countries.

The econometric model 1 is given in the following:

$$IMFRT_{it} = \beta_0 + \beta_1 FEMPR_{it} + \beta_2 LIMMU_{it} + \beta_3 SDWF_{2it} + \beta_4 GDP_{it} + \mu_{it} \quad (1)$$

Where the subscript "i" shows the chosen, detailed, countries (i = 1…9 for chosen developing nations), however, "t" reveals time specification. IMFRTit estimates the infant mortality rate (Per 1000 live Births). IMMU gives details of Immunization (measles). SDWF it indicates a safe drinking water facility (% of the population). And finally, GDPit shows GDP (Constant $US). μit shows the error term

RESULTS AND DISCUSSIONS

Initially, we explain the descriptive statistics and in the next, we will describe the results of the fixed effects model. A link between infant mortality rate and explanatory factors has been shown here.

Table 1. Descriptive statistics.

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
IMFRT	189	29.0545	20.82511	1.5	87.8
FEMPR	189	37.63547	17.845338	10.987	102.891
IMMU	189	86.11111	12.88465	56	99
SDWF	189	90.36269	6.817791	75.653	145.4573
GDP	189	9212.138	6435.023	1692.422	28176.4

Table 1 reveals basic summary statistics of the variables. It is found that on average, the infant mortality rate is 29.0545 percent. The mean value and standard deviation value of immunization are 86. 1111 and 12.88465. Similarly, on average economic growth is 9212.138 percent in developing economies. On average, the female employment rate is 37.63547 percent in the concerned nations. Additionally, people using safe drinking water facilities are shown as 90.36269 percent in developing nations.

Hausman specification test shows the Chi2 value as 24.69 and Probability is 0.0001 which supports the fixed effects result.

Table 2. Fixed Effects Results where Infant mortality rate is the dependent variable.

Variables	Coefficients, Standard Errors and z-values
FEMPR	-0.1110*
	0.0413
	(-2.68)
IMMU	-0.6816*
	0.0553
	(-12.32)
SDWF	-0.3746 *
	0.0850
	(-4.41)
GDP	-0.0007*
	0.0002
	(-4.75)
C	2.0199
	0.2549
	(7.91)
R2 Within	0.70
R2 Between	0.79
R2 Overall	0.76

T-values are in parentheses, * p<0.1.

Female employment rate is a very important factor in decreasing the infant mortality rate. Working females are financially strong and contribute much to fulfilling the basic needs of the family and also have awareness regarding good health and nutrition of children. So, they take great care of their children. The result shows that one one-unit increase in female employment leads to a decreased infant mortality rate by 0.1110 percent in developing countries. The finding is consistent with Dutta et al. (2020). The role of immunization cannot be ignored. As its accessibility may contribute much to improved health status. The result highlights that one percent increased immunization results in decreased infant mortality rate by 0.6816 percent. The reason may be that better immunization results in decreased mortality. The finding is supported by Akinlo and Sulola (2019).

Access to safe drinking water facilities also influences infant mortality in developing economies. The availability seems to be affecting the health of the population in a positive way and may decrease the infant mortality rate. It is found that a one percent increase in safe drinking water facilities will cause for 0.3746 percent decreased mortality rate in developing countries. The reason may be that clean availability of water protects people from diseases and they may survive for a long time.

Economic growth may also affect the infant mortality rate in developing economies. One percent increased GDP will result in a decreased mortality rate of 0.0007 percent in developing economies. The reason may be that high economic growth will make more investment and employment and financially strengthen the community. So they will improve their living standard by improving children's nutrition and health status. The result is supported by Dutta et al. (2020).

CONCLUSIONS AND RECOMMENDATIONS

Infant mortality has been observed as a severe issue in developing nations of the world. The existing research focuses on the impact of immunization on female employment along with other factors on infants' mortality rate in developing economies. By using the fixed effect technique, it is found that female employments seem to be reducing infant deaths. The result also shows that the availability of vaccination also results in a lower infant mortality rate. It is concluded that economic growth and availability of safe

drinking water supply also contribute to lessening infant death in developing nations of the world. On the basis of findings, it is suggested that females should be given more employment chances for playing a positive role in reducing infant death. The government must provide more vaccination availabilities on time to infants for the survival of the lives of infants. For this, there is a serious need for a properly regulated system to decrease child deaths in these nations. Moreover, there should be more employment and job chances for all segments of the communities for their children's nutrition and survival.

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