Bulletin of Business and Economics, 13(2), 870-876
https://bbejournal.com
https://doi.org/10.61506/01.00403

Assessment of Inequality of Opportunity in Access to Maternal Healthcare Services in Khyber Pakhtunkhwa, Pakistan

Jawad Rahim Afridi[1], Sajjad Ahmad Jan[2]

Abstract
Despite the significance of maternal healthcare services (MHCS) for protecting the health and welfare of mothers and newborns, access to MHCS is still a problem in many nations, including Pakistan. Given the high rates of maternal mortality in Pakistan. An analysis has been carried out to measure the inequality of opportunity (IO) of MHCS in Khyber Pakhtunkhwa (KP) and the marginal contribution of circumstances and efforts to the IO in KP, using data from the Pakistan Demographic Health Survey in 2012–13 & 2017–18. The findings stated that access to MHCS, especially antenatal care (ANC) and skilled birth attendants (SBA), has improved. Postnatal care (PNC) coverage, however, has decreased, highlighting the need for more attention. The marginal contribution of circumstances or efforts to inequality of opportunity in KP's MHCS was also determined using the Shapley decomposition approach. According to the findings, the important and contextual factors influencing the increasing inequality of ANC and SBA have been women's education, husband education, and wealth status, while the others contributed to the reduction. Similarly, husband education, women's own decisions about health, and exposure to mass media contribute to the inequality of opportunity, i.e. PNC in the case of KP, Pakistan. However, place of residence, women's education, wealth status, and distance play significant roles in decreasing the inequality of PNC in KP. These results might serve as the foundation for developing policies and initiatives that increase maternal healthcare service access and lessen inequality in KP.
Keywords: MHCS, Inequality of Opportunity, Khyber Pakhtunkhwa, Pakistan

1. Introduction

Long since some economists have shown immense interest in the inequalities and their global implications. Previous studies had mainly concentrated on income or consumption inequality, but it was later discovered that the major hindrance in the economic growth of least developed countries (that are already tackling basic education, health, infrastructure, and other essential public needs) lies in the inequalities of opportunity (IO). It was also noticed that there was a significant requirement for the recognition of these multidimensional challenges that are generated due to IO, especially for developing countries and their policymakers (Nizamani et al., 2020).

"Unequal opportunity caused by circumstances at birth, such as ethnicity, gender, caste, religion, and place of origin, which are beyond the individual's control, is widely seen as intrinsically unfair, and unfairness disturbs people and can lead to social conflict," according to the World Bank (2006).

The stated discussion changed the economic world by changing the debate on inequality from income to opportunity, emphasizing the need for a country to level the playing field during its foundational time of development in order to achieve long-term progress (Ashraf & Ali, 2018; Nizamani et al., 2020).

IO is a phenomenon in which the family background and the social status of an individual affect his opportunities to get esteem in society (Rawls, 1971). Equality of opportunity is an ideal situation for any society, and this goal can only be achieved when everyone has similar access to health, education, nourishment, etc. (Sen, 1988). IO has two factors: circumstances and efforts. Those factors that are not in control of any individual are known as circumstances, such as parental education and their occupation, socio-economic status of parents, region, race, or religion. On the other hand, choice of leisure or work, the choice to get an education, health investment, etc. are considered as inequality due to efforts (Roemer, 1993; Roemer, 1998).

Since the twentieth century, the globe has witnessed tremendous advancements in medical research and technology for better health. Health is seen as a basic human right (UN, 1948; Heywood, 2009; Asif et al., 2019; Asif et al., 2021). Researchers agree that improved health should be considered as both a means and an end to achieving development, and that a nation's level of development should be measured by the health status of its population and the equitable distribution of health care services across the population (Meara et al., 2015; Asif et al., 2022; Hydari et al., 2019).

Although the World Health Organization (WHO) and the Universal Declaration of Human Rights (UDHR) defend the fundamental right to health, many underdeveloped countries do not have this right, and women are frequently denied healthcare (Bennink, 2012). The effects of this deprivation can be seen in maternal health (Banda et al., 2017; Adedini et al., 2014; Asif et al., 2022; Asif et al., 2023). In many underdeveloped nations, women confront obstacles while trying to get healthcare services. The basic and fundamental human right to health is infringed upon when a certain part of society is excluded and deprived of healthcare (Cook, 1993). The situation in developing countries necessitates the immediate availability and accessibility of maternal health care services (MHCS), particularly those from low socioeconomic categories (Stenberg et al., 2014; Ali & Senturk, 2019; Asif et al., 2022).

Economic development and health outcomes are very much interconnected. Poverty, on the one hand, leads to bad health. When one's health deteriorates more, it exacerbates poverty due to a lack of job opportunities. On the other hand, good health boosts productivity, opens up new job prospects, and thus helps people earn more money. Increased income promotes good health, which leads to increased prosperity and well-being (Afridi et al., 2021). Because 'health matters to economic development' and 'economic development matters to health,' health indicators are extremely important for policymakers when developing economic policies (Martin et al., 2012; Barro, 1996).

Access to maternal health care is a key component of human development, as per the Goal-3 and Goal-9 of Sustainable Development Goals and the World Health Organization (WHO) (Marmot et al., 2008; Asif et al., 2021). Because good health is essential to sustainable development, and the 2030 Agenda reflects the complexity and interconnection. Universal health coverage and the right to infrastructure have been integral to achieving SDG-3 and SDG-9 for ending poverty and reducing inequalities.

[1] Corresponding Author, PhD. Scholar, University of Peshawar, Pakistan, jrafridi67@gmail.com
[2] Associate Professor, University of Peshawar, Pakistan, sajjadahmadjan@uop.edu.pk

Progress and investments to improve MHCS for women during and after pregnancy result in a 38 percent reduction in maternal death rates. In the 2000's it was 342 deaths per 100,000 live births decreased to 211 in 2017 (World Health Organization, 2018).
In health-care indicators, maternal health care is a key cause of newborn and maternal death all over the world. The aforementioned causes continue to be accountable for large inequities in access to MHCS around the world, including Pakistan especially Khyber Pakhtunkhwa (KP) (Ettarh & Kirnani, 2012; Asif et al., 2022).
Progress in health care is a metric by which any society's socioeconomic progress can be measured. In terms of health care indices such as life expectancy, child mortality, and maternal mortality, the world has made great progress (Wang et al., 2016), but developing nations, such as Pakistan, are lagging far behind, particularly in terms of neonatal and maternal mortality rate (MMR). The global MMR and newborn mortality rate (NMR) are reported at 216/100,000 live births and 18.6/1000 live births, respectively; however, Pakistan's prevailing rate is 178/100,000 live births and 45.6/1000 live births (World Health Statistics, 2018).
KP has a population of 35.53 million people, making it the Pakistan's third most populous province. Despite having a huge network of healthcare facilities, the KP maternal mortality rate is alarming, i.e. 165 per 100,000 live births. Given KP's high maternal mortality rate, it's natural that insufficient and unequal access to MHCS in different districts could result in a high maternal death rate.
Unfortunately, only 69% of Pakistani women had at least four prenatal care visits during their pregnancy in 2020. Sixty-six percent of deliveries are supervised by competent birth attendant take place in healthcare facilities. While access to postnatal care services stands at very low, i.e. 30% (PSLM, 2019-20). The high maternal mortality rates mentioned could be related to a variety of circumstances (regional disparities). Inequality in household circumstances, such as husband education, place of residence, region, distance to nearest health facilities, wealth status, and differences in efforts, such as women empowerment, exposure to mass media, and employment status of both wife and husband, contribute to in maternal health care services. Inequality of health service can be estimated by using the univariate approach (Sahn, 2009) or the opportunity approach (Jusot et al., 2010).
The evolution of maternal healthcare utilization in KP reveals a bleak picture over time. As a result, the current research intends to assess the IO in access to MHCS in Khyber Pakhtunkhwa (KP), as well as the marginal and relative contributions of circumstances and efforts to the inequalities in maternal health care services in Khyber Pakhtunkhwa (KP), Pakistan.

2. Methodology

The Human Opportunity Index (HOI) is one of the tools to measure the inequality of opportunity. HOI measures the coverage rate of opportunities and how they are equally distributed among the groups, discounted by unequal circumstances or efforts. The range of HOI is 0 to 100; 0 means no opportunity, while 100 means equal opportunity (De Barros et al., 2009). Soremekun et al. (2016) defined HOI as "the extent of a society's current opportunities that are accessible and have been allocated fairly."

$$\mathrm{HOI} = \bar{\mathrm{p}}(1 - \mathrm{D})$$

$\mathrm{D} = \text{Dissimilarity index (D} - \text{Index)}$ $\quad\quad$ $\bar{\mathrm{p}} = \text{Average Coverage}$

(1- D) denotes the fraction of available opportunities that are dispersed evenly. As a result, HOI can also be thought of as the average service coverage rate, discounted by 1 minus the dissimilarity index. When services are fairly distributed, the value of dissimilarity index (D) is zero, indicating that HOI is equivalent to average coverage rate, indicating that perfect equality of opportunity exists in the society. On the other hand, if no one in society can access the services, the value of D is 1, indicating that HOI is zero, indicating that people in this society cannot access basic services;

$$\bar{\mathrm{p}} = \sum_{\mathrm{i}=1}^{\mathrm{n}} \mathrm{w_i p_i}$$

$\mathrm{w_i} = \frac{1}{\mathrm{n}}$ here "n" means the sampling weights $\quad\quad$ $\bar{\mathrm{p}} = \text{Overall coverage}$

$$\mathrm{D} - \text{index} = \frac{1}{2\bar{\mathrm{p}}} \sum_{\mathrm{i}=1}^{\mathrm{n}} \mathrm{w_i} |\mathrm{p_i} - \bar{\mathrm{p}}|$$

$$\mathrm{p_i} = \text{Coverage rate of circumstance or effort of each group}$$

The D-index calculates the disparity in access to fundamental services amongst groups from the same population, assuming they have the same circumstances or efforts and average coverage rate for the same services. It not only evaluates how much dissimilarity or unequal distribution of opportunity exists between different groups, but also how much reallocation of the proportion of opportunities is required to achieve equality of opportunity. The D-Index ranges from 0 to 1. We may compute it in percentages: 0 indicates perfect equality and 1 indicates perfect inequality means that as the D-index value rises it leads to inequality. The HOI shows us the aggregate value of (in)equality of opportunity, however, it does not show the underlying conditions like circumstances and efforts that cause this (in)equality. To show the contribution of the underlying conditions to the (in)equality of opportunity, we estimate the Shapley Decomposition Index.

2.1. Shapley Value for Decomposition of the dissimilarity index

After estimating the inequality of opportunity proxies by the HOI, we assess the marginal contribution of each circumstance and effort variable to inequality by using the Shapley decomposition procedure proposed by Shorrocks (1999). He introduced a single paradigm, based on the concept of Shapley value in cooperative games, to calculate the marginal contribution of each underlying factor to the inequality of opportunity. To determine the influence of each circumstance or effort variable, $\mathrm{p_j}$, in inequality of opportunity of maternal healthcare services (MHCS), we have used the Shapley value to calculate their marginal affects (Amara and Jemmali, 2017; Ersoda and Aran, 2013; World Bank, 2006).
Formula of Shapley value:

$$\mathrm{D_{p_j}} = \sum_{\mathrm{S} \subseteq \mathrm{N}/\mathrm{p_j}}^{\frac{|\mathrm{s}|!(\mathrm{n}-|\mathrm{s}|-1)!}{\mathrm{n}}} [\mathrm{D}(\mathrm{S} \cup \{\mathrm{p_j}\}) - \mathrm{D}(\mathrm{S})]$$

Where
N = Total number of circumstances or efforts selected for study i.e. women's education or employment
n = Total number of circumstances or efforts in set N
S = Subset of circumstances or efforts that does not include $\mathrm{p_j}$

D(S) = Function of subset of circumstances or efforts that does not include p_j
D(S ∪ {p_j}) = Function of subset of circumstances or efforts combined with p_j
The marginal contribution of each circumstances or efforts p_j to the dissimilarity index can be calculated as follows:

$$\theta_{p_j} = \frac{D_{p_j}}{D(N)}, \qquad \text{where } \Sigma_{i\in N} D_{p_j} = 1$$

θ_{p_j} expresses the proportionate contribution of circumstance or effort P_j to the total value D(N) in a Shapley decomposition. The normalization condition $\Sigma_{i\in N} D_{p_j} = 1$ ensures that the sum of the contributions from all circumstances or efforts P_j in the set N equals to 1.

2.2. Model

The functional forms of model are given as below;

MHCS = f (Circumstances, Efforts)

MHCS= f (Residence, Region, W.Status, H.Edu, DNHF, W.Edu, W.Emp, EMM, WODH) ... (1)

Where; MHCS = Maternal health is defined by the World Health Organization as "the health of women throughout pregnancy, delivery, and the postpartum period". It includes all the treatment that women receive during pregnancy called antenatal visits (ANC), at the time of childbirth called skilled birth attendance (SBA) and the weeks after childbirth called postnatal care (PNC);

1. ANC = Antenatal visit has been our first service variable. Antenatal care consists of regular visits and check-ups that help doctors or midwives to treat and prevent health issues during pregnancy. According to data the response for variable was coded into dichotomous variable as 1=Yes and 0=No. If women had at least 4 or more antenatal visits then coded as yes=1 otherwise No=0.

2. SBA = Our second service variable for availability to maternal health care services is SBA. It recommends that all births should be helped by a skilled birth attendant. According to data the response for variable was recorded into dichotomous variable. If women had skilled birth attendance then coded as 1 otherwise 0.

3. PNC = Postnatal care is third access variable for maternal health care services. Postnatal care prevents complications after childbirth. According to data the response for postnatal care was coded into dichotomous. If women had received postnatal care within 42 days of delivery then recoded 1 otherwise 0 for no.

Residence: Region of residence is the first circumstance variable of our study. Women's residence is divided into two categories, if women reside in rural, coded as 0 and 1 for urban residents.

Region: Women's region of residence is the second circumstance, divided into six categories. If women reside Baluchistan then coded as 0, in Punjab then coded as 1, Sindh as 2, Khyber Pakhtunkhwa as 3, Gilgit Baltistan as 4 and Islamabad (ICT) 5.

W.Status: In this study, the wealth level of the women's household was used as third circumstance variable. The wealth status was calculated based on the asset and residential characteristics of the household. Each individual was ranked according to the scores of the households in which they lived. From poorest to richest, wealth status was separated into quintiles (PDHS, 2018). Women who live in the lowest income family in the first quintile are categorized 1, women who live in the poorest household in the 2nd quintile are coded 2, women who live in a household in the 3rd quintile are categorized 3, women who live in a household in the 4th quintile are categorized 4, and women who live in a household in the 5th quintile are categorized 5.

DNHF: It is the fourth important circumstance variable. Respondents were asked regarding distance from health facility then coded for No =0 for no problem otherwise Yes=1 that distance is not a problem.

H. Edu.: Husband's education is fifth circumstance variable of our study. W Husband's education level is divided into 4 categories. If Husband's have no education then coded as 0, if Husband's have attended primary school then coded as 1, if Husband's have completed secondary school education then coded as 2 and if Husband's have completed higher education then coded as 3.

W. Edu.: Women's education is first effort variable of our study. Women's education level is divided into 4 categories. If women have no education then coded as 0, if women have attended primary school then coded as 1, if women have completed secondary school education then coded as 2 and if women have completed higher education then coded as 3.

W. Emp: Women's employment status is the second effort variable. Women's employment status is distributed into dual groups: if women's are currently not working then coded as 0, but if women's are currently working then coded as 1.

EMM: Third efforts variable of our study is exposure of mass media. The PDHS collects data on households that own a television or radio, as well as the kind of health messages that are broadcast to women through these mediums. This study considers women to have been exposed to mass media only if they report "hearing an FP message on TV or radio every day or at least once a week". If heard a family planning message then coded as 1, otherwise 0.

WODH: Women participation in decision regarding their own health care will be used as a proxy of women empowerment which is our fourth effort variable. If women participate in decision than coded as 1, otherwise 0.

2.3. Data Source

The data has been compiled from Pakistan Demographic and Health Survey 2012-13 and 2017-18 conducted by National Institute of Population Studies (NIPS) Pakistan.

3. Results

3.1. Human Opportunity Index (HOI)

The Human Opportunity Index (HOI) is a measure of a person's possibilities to achieve a desired goal, such as access to education, healthcare, or an acceptable quality of life, regardless of their socioeconomic background. It is a composite indicator that incorporates measurements of access, coverage, and quality of vital services with an emphasis on the distribution of opportunities across socioeconomic categories.

The Human Opportunity Index (HOI) was designed by economists at the World Bank to quantify the degree to which a nation provides its inhabitants with equal possibilities. The index assesses the extent to which citizens, regardless of socioeconomic status, have access to fundamental services and opportunities such as education, healthcare, and clean water.

The HOI is computed by integrating indices of access, coverage, and quality of vital services and calculating the degree of inequality in the distribution of these indicators across various socioeconomic categories. The index runs from 0 to 1, with more equality of opportunity indicated by higher values. The Human Opportunity Index (HOI) is an essential instrument for policymakers and academics to detect inequities and devise policies and initiatives to remedy them. In addition, it may be used to compare the performance of other nations and measure development through time.

Table 1: Distribution of the Coverage, Dissimilarity Index, and HOI of Khyber Pakhtunkhwa (KP), Pakistan

Health Care Service	Average Coverage Rate or Prevalence %		Inequality of opportunity D%		(1-D)%		Human Opportunity Index %	
	2013	2018	2013	2018	2013	2018	2013	2018
Antenatal Care Services	43.71	79.96	14.66	11.41	85.34	88.59	37.30	70.83
Skilled Birth Attendant	82.43	79.89	9.34	10.06	90.66	89.94	74.73	71.85
Postnatal Care	62.50	39.25	8.90	12.56	91.10	87.44	56.93	34.32

Source: Authors Calculations

3.2. Antenatal Care Service (ANC)

Table 1 shows that prenatal or antenatal care visits had a higher average coverage rate in 2013 in the KP area than skilled birth attendants and postnatal care. However, by 2018, the average coverage rate for prenatal care visits had dropped, but it had significantly improved for experienced birth attendants, giving them a better coverage rate than antenatal care visits did. In both years, postnatal care's average coverage rate remained the lowest of the three services. Compared to 2018, there was a larger degree of opportunity inequality for prenatal care visits in 2013, showing that the equitable distribution of this service has improved over time in the area. However, between 2013 and 2018, the human opportunity index (HOI) for prenatal care visits fell, reflecting a fall in the population's access to and availability of this service.

3.3. Skilled Birth Attendant (SBA)

The data in Table 1 reveals that the average coverage rate for skilled birth attendants is lower than that for prenatal care visits in 2013, but that it significantly grows and exceeds that for antenatal care visits by 2018. In both years, postnatal care has the lowest coverage rate among the three services. Inequality of opportunity for skilled birth attendants is greater in 2013 than in 2018, suggesting a gradual but significant increase in the fair distribution of this service over time in the area. Compared to the other two services, the HOI for trained birth attendants is much higher in 2018, suggesting that this service may be more widely available to the locals.

3.4. Postnatal Care (PNC)

In both years, postnatal care has the lowest average coverage rate out of the three services. For postnatal care, inequality of opportunity is greater in 2013 than in 2018, suggesting a shift towards more fair distribution of this service over time in the area. Although the HOI for prenatal care increased between 2013 and 2018, the HOI for postnatal care declined between 2018 and 2019, suggesting a deterioration in the accessibility and availability of the service to the local community.

Table 2: Shapley value decomposition of D-Index – Percentage contributions of circumstances or Efforts of MHCS in Khyber Pakhtunkhwa (KP)

Circumstances/Efforts	Antenatal Care (ANC) %		Skilled Birth Attendant (SBA) %		Postnatal Care (PNC) %	
	2013	2018	2013	2018	2013	2018
Place of Residence	4.99	6.80	16.81	7.21	12.56	6.56
Husband Education	19.02	22.52	1.21	22.94	3.01	8.20
Women's Education	10.25	25.32	21.73	22.38	25.38	12.69
Wealth Status	10.66	22.73	37.80	27.38	35.08	24.66
Distance to Nearest Health Facility	46.17	7.75	2.66	8.57	10.24	5.58
Women Employment Status	3.81	0.33	0.34	0.21	0.13	2.51
Exposure to Mass Media	0.63	12.94	17.73	8.29	13.43	21.87
Women Own Decision about Health	3.44	1.56	1.69	2.97	0.13	17.89

Source: Authors Calculations

3.5. Marginal and Relative Contribution of Circumstances and Efforts in ANC

Table 2 illustrates that women's education is the predominant determinant of inequality within the ANC. The highest proportion, amounting to 15.7%, was attributed to it, thereby contributing to the overall increase in inequality during the five-year duration (specifically, 10.25% in 2013 and 25.32% in 2018). The wealth status emerged as the second most influential factor, playing a pivotal role in the growth of IO during the years 2013 and 2014. The contribution of the subject in question to the IO experienced a growth of 12% over the span of five years, with a 10.66% contribution in 2013 and a 22.73% contribution in 2018. Exposure to mass

media is a significant household characteristic that has a contribution in inequality of opportunity. In 2013, it contributed 0.63% to IO, while in 2018, its contribution increased to 12.94%. The aforementioned contribution experienced a growth of 12% over the course of the five-year duration.

Conversely, various factors have contributed to a decrease in inequality. The role of distance to health facilities was found to be significant in reducing inequality, with a decrease of more than 39% observed between 2013 (46.17%) and 2018 (7.75%). The decline in IO can be attributed, in part, to the choices made by women regarding their own health. These decisions resulted in a reduction of 1.88% in the IO, with the rate decreasing from 3.44% in 2013 to 1.56% in 2018. In a similar vein, the employment status of women exhibited a significant influence in mitigating IO, as evidenced by a gradual decline of 3.28% over the course of the five-year survey period.

3.6. Marginal and Relative Contribution of Circumstances and Efforts in SBA

Table 2 shows the marginal and relative contribution of circumstances and efforts in SBA. The variables of husband education, distance to the nearest health facility, women's autonomy in decision-making regarding their health, and women's education have been identified as significant factors contributing to the inequality of opportunity in the context of delivery in the presence of skilled birth attendants. This observation pertains specifically to the period spanning from 2013 to 2018. The educational attainment of husbands made a modest contribution of 1.21% in the year 2013, which increased significantly to 22.94% in 2018. The data indicates a notable increase in inequality, with a specific factor contributing to 21.73% of this rise between the years 2013 and 2018. The distance to the nearest health facility emerges as the second most influential factor in the context under investigation. The contribution of the subject under investigation experienced a notable increase from 2.66% in 2013 to 8.57% in 2018. Inequality increased by 5.91% during the five years of the survey. The third most significant determinant pertains to the autonomous decision-making of women regarding their health. In the year 2013, this factor accounted for a modest 1.69% contribution, which experienced a notable increase to 2.97% by 2018. The findings indicate that there exists a marginal 1.28% contribution towards the reduction of inequality of opportunity. In a similar vein, it is noteworthy to highlight the significant impact of women's education on the measure of inequality of opportunity (IO). Specifically, over a span of five years, from 2013 to 2018, women's education has contributed an increase of 0.65% (from 21.73% to 22.38%) to the overall IO.

The factors of place of residence, wealth status, exposure to mass media, and women’s employment status have been found to have a notable impact on the reduction of inequality in skilled birth delivery within the period of five years, specifically from 2013 to 2018. The variable of place of residence exhibited a notable contribution of 16.81% in the year 2013, which subsequently decreased to 7.21% in the year 2018. The data indicates a notable decline in inequality, with a decrease of 9.6% observed between the years 2013 and 2018. In a parallel vein, it is worth noting that the wealth status variable played a significant role, accounting for 10.42% (37.80% in 2013 and 27.38% in 2018) of the observed reduction in inequality over the duration of the survey. The findings of this study suggest that there is a significant relationship between exposure to mass media and women's employment status, which in turn contributes to the reduction of inequality of opportunity. Specifically, the data indicates that a 9.44% decrease in inequality of opportunity can be attributed to exposure to mass media, while women's employment status accounts for a 0.13% reduction in inequality of opportunity over a five-year period. These results highlight the importance of considering the role of mass media and women's employment in addressing and mitigating inequality of opportunity.

3.7. Marginal and Relative Contribution of Circumstances and Efforts in SBA

In the case of PNC of KP, women’s own decisions about health, exposure to mass media, and husband education played the most important role in increasing inequality within the five-year period indicated in Table 2. Women’s own decisions about health, exposure to mass media, and husband education contribute to increasing inequality in the case of PNC by 17.76% (0.13% in 2013 and 17.89), 8.44% (13.43% in 2013 and 21.87 in 2018) and 5.19% (3.01% in 2013 and 8.20% in 2018), respectively.

Conversely, place of residence, women’s education, wealth status, and distance to nearest health facility contribute mostly to the reduction of inequality of opportunity in the case of postnatal care (PNC) services during 2013 and 2018. Women’s education contributes the most (12.69%), followed by wealth status (10.42%), place of residence (6%) and distance to the nearest health facility contribute (4.66%) respectively, in the reduction of inequality of opportunity in the case of SBA in KP.

4. Conclusion

The Khyber Pakhtunkhwa government has been working hard to expand access to health care, particularly maternal health services, because poor or unequal access to these services can have devastating effects on KP women's health (in the form of higher rates of maternal mortality) and on the country's economic development. The disparate distribution of MHCS contributes to maternal and infant mortality. Therefore, we have been measuring the inequality of opportunity index for maternal health care services in KP by using the human opportunity index. Empirical results highlight the progress made by the KP government in improving access to maternal healthcare services, particularly antenatal and skilled birth delivery services. The coverage rates have increased, and there has been a decrease in inequality of opportunity, as indicated by the dissimilarity and human opportunity indices. However, there has been a decline in postnatal care coverage, indicating the need for further attention. Overall, the findings underscore the importance of continuing efforts to ensure equitable access to maternal healthcare services in KP, Pakistan. Furthermore, we aim to determine the relative or marginal impact of external circumstances and individual efforts on the inequality of opportunity in the MHCS in Khyber Pakhtunkhwa. The Shapley decomposition technique given by Shorrocks (1999) has been utilized to determine the marginal contribution of circumstances or efforts. Decomposition analysis of our study shows that women's education drives ANC inequality. This shows a five-year increase. Wealth status and media exposure are crucial to ANC inequality. Women's employment, closeness to healthcare services, and health autonomy have been shown to reduce inequality. In SBA, inequality is affected by several things. This problem is influenced by spouses' education, health facilities' closeness, women's autonomy in decision-making, and their own education. However, location of residence, financial level, mass media exposure, and women's job status reduce disparity in the Small Business Administration (SBA). Several variables affect women's disparity in postnatal care. Women's health decisions, media exposure, and spouses' education levels all contribute to inequity. However, variables like geography, education, money, and health facilities may reduce disparity.

The study recommended allocating additional resources towards enhancing the healthcare infrastructure, particularly in remote and rural areas, given that the proximity to the nearest healthcare facility significantly impacts the availability of maternal healthcare services. Enhancing educational opportunities, particularly for women, can facilitate the expansion of access to and knowledge of maternal healthcare services. Furthermore, one way to improve healthcare systems is through investments in the recruitment and education of healthcare professionals, the improvement of healthcare standards, and the expansion of access to essential supplies and equipment.

References

Adedini, S. A., Somefun, O. D., and Odimegwu, C. (2014). Gender inequality and maternal and child healthcare utilization in sub-Saharan Africa. *Gender and Behaviour, 12*(4), 5964-5983.

Afridi, J. R., Pervaiz, Z., & Asif, M. F. (2021). Welfare implications of economic growth: An empirical assessment for Pakistan. *Humanities & Social Sciences Reviews, 9*(3), 363-371.

Ali, A., & Şenturk, İ. (2019). Justifying the impact of economic deprivation, maternal status and health infrastructure on under-five child mortality in Pakistan: An empirical analysis. *Bulletin of Business and Economics (BBE), 8*(3), 140-154.

Aran, M. A., and Ersado, L. (2013). Inequality of opportunity in access to basic services among Egyptian children. *Development Analytics Research Paper Series, 1304*.

Ashraf, I., & Ali, A. (2018). Socio-economic well-being and women status in Pakistan: an empirical analysis. *Bulletin of Business and Economics (BBE), 7*(2), 46-58.

Asif, M. F., & Pervaiz, Z. (2019). Socio-demographic determinants of unmet need for family planning among married women in Pakistan. *BMC public health, 19*, 1-8.

Asif, M. F., & Pervaiz, Z. (2022). Determinants Of Child Mortality In Pakistan: Moderating Role Of Mother's Education. *Journal of ISOSS, 8*(2), 29-40.

Asif, M. F., Ali, S., Ali, M., Abid, G., & Lassi, Z. S. (2022). The moderating role of maternal education and employment on child health in Pakistan. *Children, 9*(10), 1559.

Asif, M. F., Ishtiaq, S., Abbasi, N. I., Tahir, I., Abid, G., & Lassi, Z. S. (2023). The Interaction Effect of Birth Spacing and Maternal Healthcare Services on Child Mortality in Pakistan. *Children, 10*(4), 710.

Asif, M. F., Khalid, S., & Khalid, K. S. (2021). Effect o f Mother's Employment On Child Mortality In Pakistan: Moderating Role Of Mother's Empowerment. *Journal of ISOSS, 7*(4), 175-186.

Asif, M. F., Meherali, S., Abid, G., Khan, M. S., & Lassi, Z. S. (2022). Predictors of child's health in Pakistan and the moderating role of birth spacing. *International Journal of Environmental Research and Public Health, 19*(3), 1759.

Asif, M. F., Pervaiz, Z., Afridi, J. R., Abid, G., & Lassi, Z. S. (2021). Role of husband's attitude towards the usage of contraceptives for unmet need of family planning among married women of reproductive age in Pakistan. *BMC women's health, 21*, 1-7.

Asif, M. F., Pervaiz, Z., Afridi, J. R., Safdar, R., Abid, G., & Lassi, Z. S. (2022). Socio-economic determinants of child mortality in Pakistan and the moderating role of household's wealth index. *BMC pediatrics, 22*, 1-8.

Banda, P. C., Odimegwu, C. O., Ntoimo, L. F., and Muchiri, E. (2017). Women at risk: Gender inequality and maternal health. *Women and Health, 57*(4), 405-429.

Barro, R. (1996). Health and economic growth. World Health Organization.

Bennink, A. A. A. (2012). Accessibility and utilization of maternal health care in urban India. A demand side perspective (Master's thesis).

Cook, R. J. (1993). International human rights and women's reproductive health. *Studies in Family Planning, 24*(2), 73-86..

De Barros, R. P., Ferreira, F., Vega, J., & Chanduvi, J. (2009). *Measuring inequality of opportunities in Latin America and the Caribbean*. World bank publications.

Ettarh, R. R., & Kimani, J. (2012). Determinants of under-five mortality in rural and urban Kenya. *Rural and Remote Health, 12*(1), 3.

Heywood, M. (2009). South Africa's treatment action campaign: combining law and social mobilization to realize the right to health. *Journal of Human Rights Practice*, 1(1), 14-36.

Hydari, M. A., Abid, G., Asif, M. F., Butt, T. H., & Lassi, Z. S. (2019). The effects of COVID-19 (Corona Virus Disease 2019) pandemic: An exploratory study of Pakistan. *Int. J. Dis. Rec. Bus. Cont, 12*(1), 1431-1449.

Jusot, F., Tubeuf, S., and Trannoy, A. (2010). Inequality of Opportunities in Health in Europe: Why So Much Difference Across Countries? Health, Econometrics and Data Group (HEDG) Working Papers, 10, 26.

Marmot, M., Friel, S., Bell, R., Houweling, T. A., Taylor, S., & Commission on Social Determinants of Health. (2008). Closing the gap in a generation: Health equity through action on the social determinants of health. *The Lancet, 372*(9650), 1661-1669.

Marrero, G. A., & Rodríguez, J. G. (2012). Inequality of opportunity in Europe. *Review of Income and Wealth, 58*(4), 597-621.

Marrero, G.A. and Rodriguez, J.G. (2013). Inequality of Opportunity and Growth. *Journal of Development Economics, 104*, 107-122.

Martin, G., Grant, A., & D'Agostino, M. (2012). Global health funding and economic development. *Globalization and Health, 8*(1), 1-4.

Meara, J. G., Leather, A. J., Hagander, L., Alkire, B. C., Alonso, N., Ameh, E. A., ... and Mérisier, E. D. (2015). Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. *The Lancet, 386*(9993), 569-624.

Nizamani, S., and Waheed, M. S. (2020). Do Pakistani Kids Have An Equal Chance? A Study of Inequality of Human Opportunities for Kids in Pakistan..

PDHS. (2018). Pakistan Demographic and Health Survey 2017-18.

Rawls, J. (1971). A Theory of Justice Cambridge. MA: Harvard University Press.

Roemer, J. E. (1993). A pragmatic theory of responsibility for the egalitarian planner. *Philosophy & Public Affairs*, 146-166.

Roemer, J. E. (1998). Equality of opportunity. Cambridge: Harvard University Press.

Sahn, D. E. (2009). Health inequality across individuals of populations. In AERC, health, economic growth and poverty reduction in Africa: Framework papers review workshop. Ghana: Accra.

Sen, A. (1988). The concept of development. In Behrman, J. and Srinivasan, T.N. (Eds.), Handbook of Development Economics

Shorrocks, A.F. (1999). Decomposition procedures for distributional analysis: a unified framework based on the Shapley value. mimeo, University of Essex.

Soremekun, O., Oyeyinka, O., & Haughton, D. (2016). Sustainable Development and Inequality of Opportunity in Africa. In Sustainable Industrialization in Africa (pp. 173-199). Palgrave Macmillan, London.

Stenberg, K., Axelson, H., Sheehan, P., Anderson, I., Gülmezoglu, A. M., Temmerman, M., ... and Sweeny, K. (2014). Advancing social and economic development by investing in women's and children's health: a new Global Investment Framework. *The Lancet*, *383*(9925), 1333-1354.

United Nation. (1948). Universal Declaration of Human Rights.

World Bank. (2006). *World development report 2006: Equity and development*. The World Bank.

World Health Organization. (2018). World health statistics 2018: Monitoring health for the SDGs sustainable development goals World Health Organization.