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RESEARCH ARTICLE

SPATIAL DIMENSION OF HEALTH CARE UTILIZATION IN WEST BENGAL

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ABSTRACT

Background: Since centuries, health has been a concern with mankind, living in different countries of the World. Consequently, the health care utilization is one of the most important aspect of health sector to deal with development of health in any administrative region. The objectives of the present study is to investigate health care utilization and to find out associated factors in the state of West Bengal. The study is based on secondary source of data (National Family and Health Survey, NFHS-4, 2015-16). **Method:** The Karl Pearson Correlation Coefficient technique has been applied to reveal factors associated with health care utilization. Besides, a Dimension Index is constructed to depict overall situation in health care utilization. A numbers of tables, figures, maps have helped for easy depiction and illustration of the health care utilization and education across districts of West Bengal. **Results:** It is found in the study that the level of health care utilization and education is very low in Uttar Dinajpur and Malda districts of West Bengal while good performing districts are Darjiling, Nadia, Bankura, Birbhum, Kolkata, Hugli and Paschim Medinipur. The study finds positive association between literacy and health care utilization.

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INTRODUCTION

Health has been a matter of universal concern in all times of history and therefore have attracted the attention of the academicians, planners, policy makers and researchers. Health has been an important and fundamental aspect of every society and the most significant component of well-being of life. Despite tremendous efforts made by State and Central Government of India for betterment of health, the healthcare utilization has not reached up to its desired level where there is a resolution of ' health for all' by WHO and UNICEF. In this direction, the state of West Bengal has not reached at its desired level of health care utilization and health condition. Among Indian states and Union Territories, the NFHS-4 reflects West Bengal lies down at 13th position having more Infant Mortality Rate of 28 per 1000 live births where Kerala performs best with very few IMR of 6 per 1000 live births. The West Bengal reports very low percentage of mothers receiving financial assistance under Janani Suraksha Yojona with 28.70 percent while India records 36.40 percent. The share of institutional births (75.20 %) is comparatively lower in West Bengal than India (78.90 %). Though in full immunization and vaccination of children age 12-23 months, West Bengal performs very well with 84.40 percent than India (62 percent). The share of women age 15-19 years who were already mothers or pregnant at the time of survey (2015) in India is 7.90 % where West Bengal reports 18.30 percent (NFHS-4, 2015-16). The share of woman's schooling of more than 10 years in West Bengal is lower (27 percent) than India with 36 percent, (NFHS-4, 2015-16). In the present paper, the district level variation in health care utilization and education of West Bengal are investigated.The existing relevant studies have helped to find factors of lower health care utilization of West Bengal in the present study.

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LITERATURE REVIEW

Leslie (1991) has found that women's nutrition is a key to improve family health in developing countries. The problems associated with women's malnutrition are many more and wide ranging like that of reduced quality of women, impaired ability to nurture children and income generating works. Macfarlane *et al.* (2000) has shown poverty as a determinant which excludes people to take benefits of health care system in developing countries resulting health and well-being inequalities. Shieh *et al.* (2009) has correlated women's health with health literacy as women's knowledge on health, health system, health care are influenced by health literacy. The health literacy as per U.S. Department of Health and Human services is "the degree to which individuals have the capacity

to obtain, process, and understand basic health information and services needed to make appropriate health decisions". Viera *et al.* (2010) has conducted a study to find out determinants responsible for breastfeeding within first hour of life among Brazilian population. The prenatal guidance about breastfeeding benefits, vaginal delivery and full term birth by health professionals are significant determinants promoting breastfeeding just after baby born. Hahn *et al.* (2015) has revealed linkage of education and public health. It is found that education is an important social determinant of health as educational components like fundamental knowledge, reasoning ability are considered as critical components of health. It is also found that education promotes health equity. Therefore it is suggested to implement such educational programs and policies which are formulated with equal collaboration of educators and health practitioners for better public health benefits.

Grossman (2015) has mentioned that schooling years has positive correlation with good health. Though there is enough conflicting evidence which contradicts such association. It is concluded to conduct more research to find whether schooling years and good health associates or not. Chokshi *et al.* (2016) has investigated that the utilization and delivery of health services and the health outcomes are influenced by health systems and health policies. The health care to mother and child has been focal target so far in India through health policies. Despite it, the achievement is less than target. Therefore it is suggested in the study to frame policies which will help to build capacity of existing human resources and more allocation of finance for new-born care. Such initiatives can enrich quality and quantity of health care for mother and new- born in India. Santhanalakshmi *et al.* (2017) has studied about public expenditure on health and family welfare for the period of 2001 to 2015 by Central and State Government in India. It is found that there is a steady increase of total expenditure on health an family welfare over study periods. It is argued that the Government expenditure on health has been influenced by population, per capita income and number of hospitals in the study. Marphatia *et al.* (2017) has revealed that women's marriage age has an association with public health. The study was conducted on South Asian countries of Bangladesh, Nepal, India and Pakistan where a significant proportion of women still get married before of their 18 years of age. The study finds bad impact of women's early age marriage which are malnutrition, greater rates of morbidity and mortality. It is concluded in the study that women's early age marriage also restricts them from educational attainment resulting lower social status of women. Bhattacherjee *et al.* (2017) in their study has found an unexpected low utilization of maternal health care services. The lower literacy of husband and wife, grim socio-economic status, ignorance and distance to health care centres have been identified for low maternal health care utilization in Tea Garden of Darjeeling, West Bengal.

OBJECTIVES

- To study health care service utilization across districts of West Bengal.
- To depict overall situation of education and health care utilization.
- To highlight associated factors of health care utilization in the study area.

DATABASE AND METHODOLOGY

The paper is based on secondary source of data. The National Family and Health Survey(NFHS) releases data on health, nutrition. The NFHS-4, 2015-16 data has been used in the present paper. The each NFHS report of every district of West Bengal contain huge data on health, health care utilization and nutrition. The researcher has compiled such standalone report data to depict the pattern of health care utilization and education in West Bengal. In addition, to get adequate information and explanation related to topic various national and international journals, articles, reports have been used in the study. The NFHS data is in simple percentage form. To depict spatial pattern of health care utilization and services in West Bengal, a number of figures, tables, maps are prepared. Besides, the statistical technique of Karl Pearson Correlation Coefficient has been applied to highlight correlation and association between the variables dealing with health care utilization and health. A 'Dimension Index' is constructed to reveal health situation across the districts of West Bengal based on following eleven indicators.

- Men who are literate (%)
- Women who are literate (%)
- Women with 10 or more years of schooling (%)
- Mothers who had full antenatal care (%)
- Mothers who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (%)
- Mothers who received financial assistance under Janani Suraksha Yojana (JSY) for births delivered in an institution (%)
- Institutional births (%)
- Institutional births in public facility (%)
- Children age 12-23 months fully immunized (BCG, measles, and 3 doses each of polio and DPT) (%)
- Children under age 3 years breastfed within one hour of birth (%)
- Total children age 6-23 months receiving an adequate diet (%).

$$\text{Dimension index} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

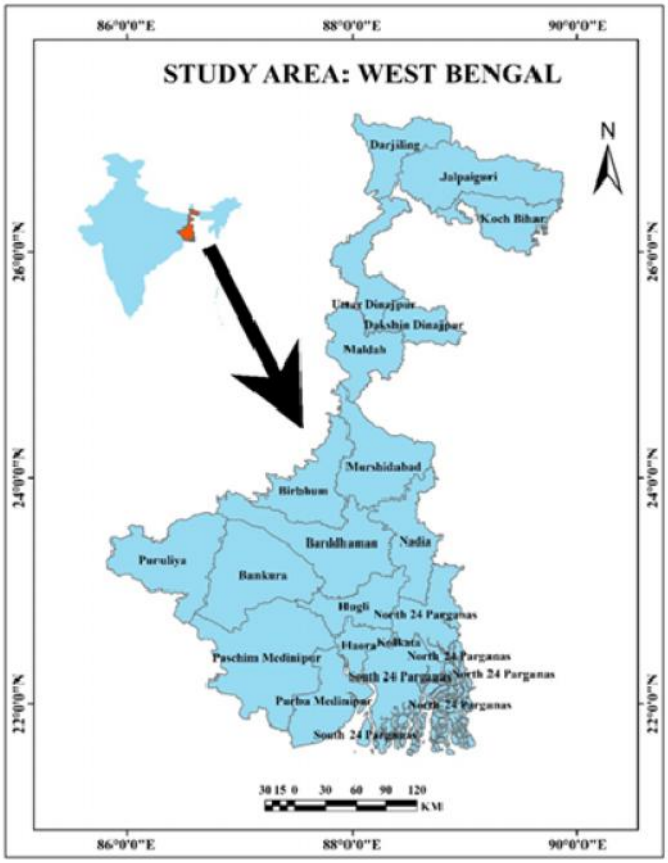
$$\textit{Dimension index} = \frac{\textit{Actual value of the indicator} - \textit{Minimum value}}{\textit{Maximum value} - \textit{Minimum value}}$$

Actual value = actual value of the indicator
Maximum value= maximum value of the indicator
Minimum value= minimum value of the indicator.
A Choropleth Map has been prepared for easy depiction of level of education and health care utilization in the state of West Bengal.

STUDY AREA

The study area selected for this present paper is the state of West Bengal which is an easternmost state of India. The latitudinal and longitudinal extend of the state is from 21°25'24"- 27°13'15"N and from 85°48'20"E - 89°53'04"E respectively. The state area-wise ranks 14th position in India with 88,752 Sq. Km. Though, prior to 2011, there were only 19 districts in West Bengal, but now there are twenty three districts resulted by splitting of bigger districts for better

administrative purposes. The study deals with only nineteen districts due to data availability. Kolkata, the capital of West Bengal is known as 'City of Palaces' and 'City of Joy'. The varying climate like that of tropical wet-dry climate in the southern part and a humid subtropical climate in the northern part of West Bengal prevail. The annual precipitation also varies from region to region but the annual precipitation of West Bengal is 162 cm. It is the fourth most populous state of India having 7.8 percent of India's population (Census of India, 2011). The sex ratio of West Bengal has been improved when we compare data of NFHS-5,2019-20 (1049) and Census of India, 2011 (950). The decadal population growth of the state is 13.84 percent. The population density of West Bengal is 1028/km$^{2.}$ As per Census of India, 2011, the literacy rate is 76.26 percent in West Bengal which is comparatively little better than national average.



Source: Base-map sourced from Census of India, 2011.

Map No 1. Location of West Bengal in India

EDUCATION

The education has significant impact on public health as improving educational level leads to improving health condition of the people of a region (Haan *et al.,* 2015). The health care utilization also depends on education. Therefore, there is an utmost need to see the present educational level in different districts of West Bengal. The overall picture of health in West Bengal depicts gender gap in women literacy (about 71 %). Shieh *et al.* (2009) has noted "low health literacy negatively affects a woman's health knowledge, preventive behaviour, ability to navigate the health care system, and ability to care for her children". The above argument supports for an urgent need to improve women literacy which must improve public health status and health care utilization.

The education among men is also a prerequisite for better health care utilization. The literacy among men is highest in Darjiling district out of all districts of West Bengal. The worst performing districts are Uttar Dinajpur (65 %), Malda and Barddhaman. Along with worst performing districts, the districts of North 24 Parganas, Koch Bihar, Nadia, South 24 Parganas, Puruliya, Jalpaiguri perform lower than state's men literacy (81 %). However, the lowest women literacy is reported in Puruliya district (48 %), Uttar Dinajpur and Birbhum. The North 24 Parganas performs comparatively best in women literacy followed by Kolkata.

Table No. 1: Literacy Pattern among Men and Women of West Bengal

Districts	Men who are literate (%)	Women who are literate (%)
West Bengal	81.10	70.90
Darjiling	95.00	78.20
Jalpaiguri	74.50	64.20
Koch Bihar	80.80	66.80
Uttar Dinajpur	65.10	51.10
Dakshin Dinajpur	83.20	67.30
Maldah	71.70	64.20
Murshidabad	85.10	66.10
Birbhum	86.20	62.10
Barddhaman	72.60	66.60
Nadia	79.70	73.70
North 24 Parganas	80.90	82.90
Hugli	85.80	76.30
Bankura	83.70	65.20
Puruliya	76.50	48.10
Haora	89.00	78.40
Kolkata	84.30	80.70
South 24 Parganas	76.90	74.60
Paschim Medinipur	82.90	70.70
Purba Medinipur	89.30	76.10

Source: NFHS-4, 2015-16.

SCHOOLING AMONG WOMEN: Grossman (2015) has found positive correlation between schooling year and health. Therefore, the analysis of schooling year of women as a determinant bears significance in the study. The women having 10 years or more years of schooling is found highest in Kolkata, followed by North 24 Parganas and Darjiling. The better socio-economic life caused by urbanization and industrialization leads Kolkata for better women schooling. The women have very low schooling in the districts of Puruliya, Malda and Uttar Dinajpur. The poor socio-economic condition push for low years of schooling and education (Rodriguez, 2020). Ultimately, parents prefer for the early marriage. Though in the state of West Bengal, the policy intervention like that of Kanyashree Prakalpa (annual scholarship to girls upto XII standards) launched by state government has increased women schooling.

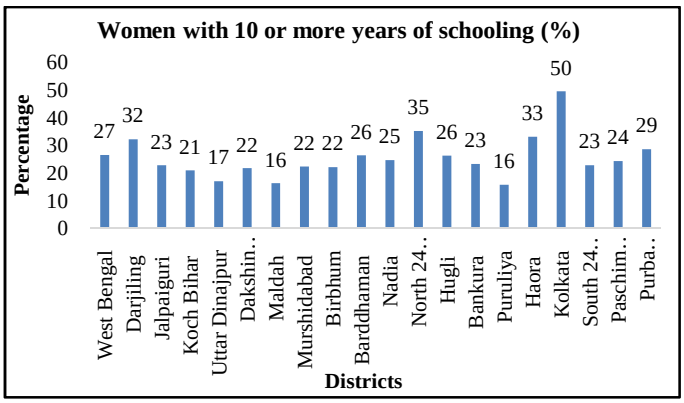


Fig. No. 1. Pattern of woman's schooling years in West Bengal.

UNDER-AGE MARRIAGE: Studies and organizations like that of WHO reveal the adverse impact of early marriage and child marriage on human health. Flavia Bustreo, M.D., Assistant Director-General for Family, Women's and Children's Health at the World Health Organization has rightly mentioned that "complications of pregnancy and childbirth are the leading cause of death in young women aged 15–19. Young girls who marry later and delay pregnancy beyond their adolescence have more chances to stay healthier, to better their education and build a better life for themselves and their families". A study conducted by Marphatia *et al.* (2017) suggests that despite recent improvement, a significant proportion of women from Bangladesh, India, Nepal and Pakistan still marry before 18 years of their age. The 18 percent women from 15-19 age group become either mother or pregnant in West Bengal. It is very high in the districts of Murshidabad, Malda, Birbhum and Koch Bihar. The district of Kolkata which is the state capital and Haora have lowest share of under-age marriage.

Table No. 2. Pattern of Under-age Marriage in West Bengal

Districts	Women age 20-24 years married before age 18 years (%)	Women age 15-19 years who were already mothers or pregnant at the time of the survey (%)
West Bengal	41.60	18.30
Darjiling	21.90	10.10
Jalpaiguri	34.50	9.70
Koch Bihar	41.80	23.60
Uttar Dinajpur	39.70	17.40
Dakshin Dinajpur	45.10	19.50
Maldah	56.80	24.90
Murshidabad	53.50	29.50
Birbhum	51.30	24.90
Barddhaman	41.20	14.40
Nadia	43.10	21.90
North 24 Parganas	36.50	18.70
Hugli	31.90	19.60
Bankura	39.00	16.60
Puruliya	43.70	21.70
Haora	25.60	7.20
Kolkata	13.40	4.80
South 24 Parganas	48.80	19.30
Paschim Medinipur	52.60	15.60
Purba Medinipur	44.00	19.60

Source: NFHS-4, 2015-16.

FULL ANTENATAL CARE: The share of mothers having full antenatal care in West Bengal is 22 percent. Among districts of West Bengal, the Uttar Dinajpur have lowest share of mothers taking full antenatal care (4 %). The similar grim situation is reported in Malda (12 %), South 24 Parganas and Birbhum (16 %), North 24 Parganas, Murshidabad and Koch Bihar (17 %). Comparatively best situation prevail in the district of Bankura (41 %). Moreover, more than 30 percent mothers are taking full antenatal care in the districts of Haora, Kolkata, Darjiling, Nadia and Bankura (Fig. No.2).

POSTNATAL CARE AND JANANI SURAKSHA YOJONA: The percentage of mothers receiving postnatal care in West Bengal is 61 percent while it is very low in Malda district (36 %) followed by Uttar Dinajpur (46 %), Murshidabad (47 %). Darjiling records highest in receiving postnatal care with 85 %. The postnatal care taken by mothers is also better in Kolkata (83 %), Haora (82 %). In the percentage range of 70-80 the districts of Birbhum, Paschim Medinipur, Hugli and Jalpaiguri lie. Among the districts of West Bengal, only in three districts like that of Uttar Dinajpur,

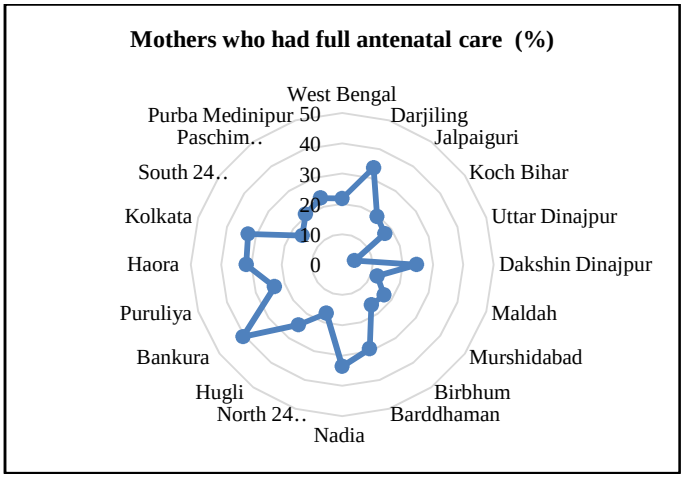


Fig. No. 2. Mothers with full Antenatal Care in Districts of West Bengal

Malda and Murshidabad the share of mothers taking postnatal care is less than 50 percent. The Janani Suraksha Yojana is a yojana where mothers after institutional delivery get financial assistance. The Koch Bihar (47 %), Murshidabad (47 %) and South 24 Parganas (41 %) receive highest financial assistance under Janani Suraksha Yojana (Table No. 3).

INSTITUTIONAL BIRTHS: The 75 percent institutional births are reported in West Bengal. The highest institutional births are found in Kolkata and Darjiling (95 %) followed by Nadia (93 %), Hugli (91 %). The institutional birth lie within 80-90 percent in the districts of North 24 Parganas, Haora, Birbhum, Bankura, Jalpaiguri, Barddhaman and Koch Bihar. The percentage of institutional delivery is lowest in Uttar Dinajpur (47 %). The institutional delivery is less than 60 percent in the districts of Malda, South 24 Parganas and Uttar Dinajpur. The institutional births in public facility is recorded highest with 76 %. The institutional births in public facility is reported lowest in South 24 Parganas (36 %) followed by Haora and Uttar Dinajpur (38 %), Purba Medinipur (45 %), and Malda (48 %) (Table No. 4).

IMMUNISATION: The share of child immunization in West Bengal is 84 percent. The data show that the children (12-23 months aged) immunization is lowest in Uttar Dinajpur (66 %) while the best district in child immunization is Bankura (96 %) followed by South 24 Parganas, Nadia, Purba Medinipur, Paschim Medinipur and Birbhum (91 %). Less than 80 percent children immunization is found in the districts of Murshidabad, Koch Bihar, Haora, Malda, Kolkata and Uttar Dinajpur (Figure No.3).

BREASTFEEDING: The WHO reports that Globally 3 in 5 babies are not breastfeed in the first hour of life. It is also reported that only 41 percent of infants under 6 months of age are exclusively breastfeed. The presence of nurse during baby birth and the prenatal guidance regarding advantage of breastfeeding are some determinants influencing breastfeeding within one hour of birth (Vieira *et al.* 2010). Under 3 years of aged children who were breastfeed within one hour of their birth is highest in South 24 Parganas with 89 % followed by Barddhaman (65 %), Puruliya (59 %). The breastfeeding within one hour of birth is lowest in Purba Medinipur (28 %), North 24 Parganas (33 %), Hugli and Darjiling (38 %), Koch Bihar (39 %). Bihar (39 %), (Table No. 5).

Table No. 3: Pattern of Postnatal Care and Financial Assistance in West Bengal

Districts	Mothers who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (%)	Mothers who received financial assistance under Janani Suraksha Yojana (JSY) for births delivered in an institution (%)
West Bengal	61.10	28.70
Darjiling	84.60	26.40
Jalpaiguri	69.70	34.90
Koch Bihar	68.80	47.40
Uttar Dinajpur	46.30	26.00
Dakshin Dinajpur	65.90	28.30
Maldah	35.70	31.10
Murshidabad	47.00	47.00
Birbhum	78.60	39.20
Barddhaman	62.40	24.80
Nadia	60.60	29.40
North 24 Parganas	58.30	14.70
Hugli	69.90	22.70
Bankura	61.80	37.70
Puruliya	59.70	38.70
Haora	82.20	18.20
Kolkata	82.90	4.60
South 24 Parganas	50.80	40.90
Paschim Medinipur	74.70	29.80
Purba Medinipur	60.40	27.60

Source: NFHS-4, 2015-16.

Table No. 4: Pattern of Institutional Births in Districts of West Bengal

Districts	Institutional births (%)	Institutional births in public facility (%)
West Bengal	75.20	56.60
Darjiling	94.50	76.30
Jalpaiguri	84.00	67.60
Koch Bihar	81.20	68.90
Uttar Dinajpur	47.00	37.60
Dakshin Dinajpur	78.20	71.60
Maldah	55.00	48.30
Murshidabad	63.80	55.00
Birbhum	86.30	74.10
Barddhaman	82.60	55.60
Nadia	93.10	69.60
North 24 Parganas	86.90	64.30
Hugli	91.30	61.30
Bankura	85.60	71.50
Puruliya	72.90	68.20
Haora	86.60	37.50
Kolkata	94.80	72.50
South 24 Parganas	52.20	35.80
Paschim Medinipur	77.70	61.80
Purba Medinipur	74.10	45.00

Source: NFHS-4, 2015-16.

Table No. 5. Breastfeeding Pattern of under 3 Years Children within One Hour of Birth

Districts	Children under age 3 years breastfed within one hour of birth (%)	Total children age 6-23 months receiving an adequate diet (%)
West Bengal	47.10	19.60
Darjiling	37.70	10.70
Jalpaiguri	48.30	14.60
Koch Bihar	39.40	17.70
Uttar Dinajpur	44.20	15.20
Dakshin Dinajpur	42.40	15.50
Maldah	43.30	6.00
Murshidabad	45.50	13.40
Birbhum	54.60	30.30
Barddhaman	64.60	20.50
Nadia	50.80	32.80
North 24 Parganas	33.30	13.90
Hugli	37.50	19.30
Bankura	54.10	23.00
Puruliya	59.40	18.60
Haora	46.30	20.00
Kolkata	47.70	13.60
South 24 Parganas	89.30	24.80
Paschim Medinipur	48.10	31.80
Purba Medinipur	28.10	17.40

Table No. 6. Pattern of Body Mass Index in Districts of West Bengal

Districts	Women whose Body Mass Index (BMI) is below normal (BMI < 18.5 kg/m²) (%)	Men whose Body Mass Index (BMI) is below normal (BMI < 18.5 kg/m²) (%)
West Bengal	21.30	19.90
Darjiling	15.40	8.60
Jalpaiguri	26.10	17.40
Koch Bihar	24.80	19.80
Uttar Dinajpur	25.70	17.40
Dakshin Dinajpur	24.90	9.80
Maldah	23.90	15.40
Murshidabad	21.10	19.70
Birbhum	30.30	31.60
Barddhaman	24.00	26.00
Nadia	11.90	15.60
North 24 Parganas	11.50	17.40
Hugli	18.30	18.90
Bankura	33.30	27.80
Puruliya	47.50	24.50
Haora	16.50	20.10
Kolkata	7.30	17.20
South 24 Parganas	18.80	23.10
Paschim Medinipur	29.90	26.60
Purba Medinipur	19.40	8.30

Source: NFHS-4, 2015-16.

Table No. 7. Level of Education and Health Care Utilization in Districts of West Bengal

Districts	Men who are literate (%)	Women who are literate (%)	Women with 10 or more years of schooling (%)	Mothers who had full antenatal care (%)	Mothers who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (%)	Mothers who received financial assistance under Janani Suraksha Yojana (JSY) for births delivered in an institution (%)	Institutional births (%)	Institutional births in public facility (%)	Children age 12-23 months fully immunized (BCG, measles, and 3 doses each of polio and DPT) (%)	Children under age 3 years breastfed within one hour of birth (%)	Total children age 6-23 months receiving an adequate diet (%)
	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
Darjiling	95	78	32	34	85	26	95	76	84	38	11
Jalpaiguri	75	64	23	20	70	35	84	68	82	48	15
Koch Bihar	81	67	21	17	69	47	81	69	77	39	18
Uttar Dinajpur	65	51	17	4	46	26	47	38	66	44	15
Dakshin Dinajpur	83	67	22	25	66	28	78	72	83	42	16
Maldah	72	64	16	12	36	31	55	48	70	43	6
Murshidabad	85	66	22	17	47	47	64	55	79	46	13
Birbhum	86	62	22	16	79	39	86	74	91	55	30
Barddhaman	73	67	26	29	62	25	83	56	82	65	21
Nadia	80	74	25	34	61	29	93	70	93	51	33
North 24 Parganas	81	83	35	17	58	15	87	64	89	33	14
Hugli	86	76	26	25	70	23	91	61	88	38	19
Bankura	84	65	23	41	62	38	86	72	96	54	23
Puruliya	77	48	16	24	60	39	73	68	87	59	19
Haora	89	78	33	32	82	18	87	38	74	46	20
Kolkata	84	81	50	33	83	5	95	73	67	48	14
South 24 Parganas	77	75	23	16	51	41	52	36	95	89	25
Paschim Medinipur	83	71	24	21	75	30	78	62	92	48	32
Purba Medinipur	89	76	29	23	60	28	74	45	93	28	17

Table No. 8. Correlation (r) Matrix between the variables of Health Care Utilization and Education.

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
X1	1										
X2	.594**	1									
X3	.486*	.776**	1								
X4	.562*	.406	.485*	1							
X5	.657**	.400	.581**	.555*	1						
X6	-.118	-.540*	-.763**	-.292	-.349	1					
X7	.625**	.509*	.600**	.745**	.801**	-.400	1				
X8	.347	.023	.186	.452	.507*	.015	.703**	1			
X9	.343	.174	-.146	.297	.089	.321	.238	.225	1		
X10	-.341	-.212	-.204	.021	-.148	.316	-.296	-.203	.243	1	
X11	.088	.009	-.106	.224	.276	.195	.225	.122	.627**	.433	1

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Table No. 9. Normalised Scores and Dimension Index

Districts	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	D. I
Darjiling	1.00	0.86	0.49	0.81	1.00	0.51	0.99	1.00	0.60	0.16	0.18	0.69
Jalpaiguri	0.31	0.46	0.21	0.42	0.70	0.71	0.77	0.79	0.52	0.33	0.32	0.50
Koch Bihar	0.53	0.54	0.15	0.36	0.68	1.00	0.72	0.82	0.35	0.18	0.44	0.52
Uttar Dinajpur	0.00	0.09	0.04	0.00	0.22	0.50	0.00	0.04	0.00	0.26	0.34	0.14
Dakshin Dinajpur	0.61	0.55	0.18	0.56	0.62	0.55	0.65	0.88	0.57	0.23	0.35	0.52
Maldah	0.22	0.46	0.01	0.22	0.00	0.62	0.17	0.31	0.12	0.25	0.00	0.22
Murshidabad	0.67	0.52	0.20	0.35	0.23	0.99	0.35	0.47	0.43	0.28	0.28	0.43
Birbhum	0.71	0.40	0.19	0.33	0.88	0.81	0.82	0.95	0.84	0.43	0.91	0.66
Barddhaman	0.25	0.53	0.32	0.69	0.55	0.47	0.74	0.49	0.54	0.60	0.54	0.52
Nadia	0.49	0.74	0.26	0.81	0.51	0.58	0.96	0.83	0.90	0.37	1.00	0.68
North 24 Parganas	0.53	1.00	0.58	0.35	0.46	0.24	0.83	0.70	0.75	0.08	0.29	0.53
Hugli	0.69	0.81	0.31	0.56	0.70	0.42	0.93	0.63	0.74	0.15	0.50	0.59
Bankura	0.62	0.49	0.22	1.00	0.53	0.77	0.81	0.88	1.00	0.42	0.63	0.67
Puruliya	0.38	0.00	0.00	0.53	0.49	0.80	0.54	0.80	0.71	0.51	0.47	0.48
Haora	0.80	0.87	0.51	0.76	0.95	0.32	0.83	0.04	0.26	0.30	0.52	0.56
Kolkata	0.64	0.94	1.00	0.78	0.97	0.00	1.00	0.91	0.02	0.32	0.28	0.62
South 24 Parganas	0.39	0.76	0.21	0.33	0.31	0.85	0.11	0.00	0.95	1.00	0.70	0.51
Paschim Medinipur	0.60	0.65	0.25	0.45	0.80	0.59	0.64	0.64	0.87	0.33	0.96	0.62
Purba Medinipur	0.81	0.80	0.38	0.52	0.51	0.54	0.57	0.23	0.88	0.00	0.43	0.51

Source: Computed by author.

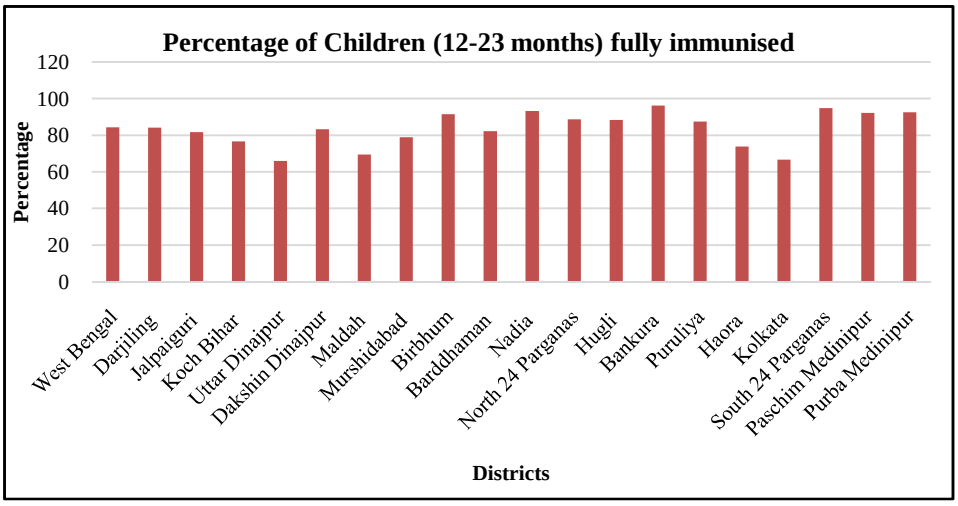
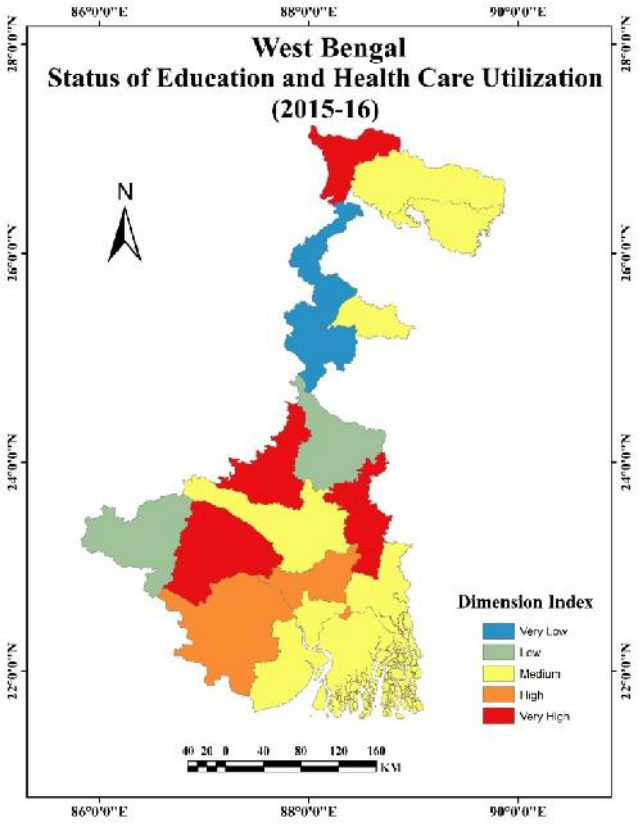


Fig. No. 3. Children (12-23 months) Fully Immunised in Districts of West Bengal

BODY MASS INDEX (BMI): The Body Mass Index of women and men are important to discuss with health and nutritionalof a society. Puruliya district has highest percentage of women whose BMI is below normal with 47 % followed by Bankura, Birbhum, Paschim Medinipur, Jalpaiguri and Uttar Dinajpur (26 %).

It is a positive issue if any district has lowest share of women whose BMI is below normal. Here, Kolkata gets that position. Though, the lowest share of women whose BMI is below normal found in Nadia, North 24 Parganas, Haora and Darjiling. On the other side, Birbhum district has highest percentage of men whose BMI is below normal with 31 %



Map No. 2. Status of Education and Health Care Utilization in West Bengal

followed by Bankura (27 %), Paschim Medinipur (26 %) and Barddhaman (26 %). Contrary to this, good performing districts in men BMI are Purba Medinipur, Darjiling and Dakshin Dinajpur (Table No. 6). The correlation matrix is computed applying Karl Pearson Correlation Coefficient technique. Here the calculated value ranges from -1.00 to +1.00. The correlation matrix helps to investigate significant correlation between variables dealing with education and health care utilization. The table no. 8 reflects that men literacy (X1) is positively correlated with women literacy (X2) at 99 percent confidence level. Meaning thereby when men literacy either increase or decrease, there is an either increase or decrease of women literacy. The men literacy (X1) influences postnatal care (X5) and institutional births (X7). In addition, there is a positive correlation between women literacy (X2) and institutional delivery (X7) at 95 percent confidence level. The woman's schooling years (X3) are associated with mothers receiving postnatal care (X5).

In the same way, the woman's schooling determines institutional births. The finding shows that the percentage of mothers taking full antenatal care (X4) and postnatal care (X5) are associated with institutional delivery (X7) at 95 percent confidence level. The child immunization (X9) and children's adequate diet (X11) is positively correlated. The Dimension Index composed with eleven indicators of health care utilization and education reveals that the health care utilization is very low in the districts of Uttar Dinajpur and Malda. Contrary to that very good health care utilization and education level prevails in the districts of Darjiling, Nadia, Bankura and Birbhum. The Kolkata, Paschim Medinipur and Hugli lie under high dimension index. Eight districts of Haora, North 24 Parganas, Dakshin Dinajpur, Koch Bihar, Barddhaman, Purba Medinipur, South 24 Parganas and Jalpaiguri fall under medium category in dimension index. As mentioned earlier that the level of health care utilization and education is very low in Uttar Dinajpur and Malda while low health care utilization is reported in the districts of Murshidabad and Puruliya (Table No.9 & Map No.2)

Conclusion

The study finds huge gender gap at men and women literacy in West Bengal. The 10 years of schooling among women is well in Kolkata but very poor situation prevails in Malda, Puruliya and Uttar Dinajpur Districts. It is also found that there is an urgent need of an intervention in early age marriage because a significant proportion of women get married before 18 years of their age in West Bengal specially in Murshidabad and Malda districts. The lack of awareness, lack of education and poverty are some of driving factors for early age marriage. Among districts of West Bengal, the mothers share in full antenatal care is lowest in Uttar Dinajpur. It has been depicted that state's institutional birth is lower (75 %) than country's share (79 %). But, the state of West Bengal performs well in full immunization, children's breastfeeding and in children's adequate diet comparing to India. However, the share of women with poor BMI is reported highest in Puruliya among districts of West Bengal. Furthermore, the percentage of men with poor BMI is found highest in Birbhum district, among districts of West Bengal. The study finds that institutional delivery and mothers receiving postnatal care are influenced by man and woman's literacy and schooling years. The dimension index reveals poor health situation in Malda and Uttar Dinajpur while good performing districts are Darjiling, Nadia, Bankura and Birbhum. A study conducted in West Bengal suggests that "apart from economic condition, the social hierarchy or the system of social stratification existing in the society of West Bengal is likely to influence the health behavior of individuals. Social stratification system determines the living conditions, privileges, obligations and cultural traditions surrounding the life of a person which in turn affect his perceptions regarding health, knowledge of health care and accessibility to health resources. There is an urgent need to strengthen the implementation of all the rural and Urban Health Care programmes and improve infant and young child feeding practices among lactating women" (Rana *et al.* 2012).Another study conducted by Bhattacharjee *et al.* in a district of W,B in 2017 has revealed factors of low maternal health care utilization as lower literacy of husband and wife, grim socio-economic situation, ignorance and distance to health care centres. Such factors might be associated for inequal health care utilization in some districts of West Bengal in the present study also.

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