RESEARCH ARTICLE

A SPATIAL ANALYSIS OF MATERNAL AND CHILD HEALTH IN UTTAR PRADESH, INDIA: EVIDENCE FROM NATIONAL FAMILY HEALTH SURVEY 4 (2015-16)

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Manuscript Info

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Abstract

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Mother needs special medical care during pregnancy, delivery, and after delivery; as a mother, she is more prone to adverse health outcomes or death due to the unsafe and unhygienic methods of managing pregnancy and childbirth. According to the World Health Organization reports, globally, 0.53 million maternal deaths occur annually, out of which 0.12 million (22%) deaths occur only in India. A newborn child needs regular health check-ups as well as nutrition supplements to avoid deficiency diseases and illness. Child health is a foundation for adult health and well-being; therefore, it is imperative to certify good health. Healthy children assure healthy adults who, in turn, ensure good progress and development of the Country (Usmani and Ahmad, 2017). According to NHM, around 81% of under-five child death occurs in one year of birth that marks approximately 10.5 lakh newborn demises; however, 57% of under-five deaths occur in the first one month of life, constituting 7.3 lakh neo-natal deaths annually within the Country.
Data and methods: data from National Family Health Survey-4 (2015-2016) on maternal and child health indicators for 75 districts of Uttar Pradesh state were used. Spatial analysis namely Moran's-I and LISA were applied to evaluate the maternal and child health indicators through all the districts of the state.
Result: Each indicator portrayed prominent coverage variation across the Uttar Pradesh districts in this analysis. Among all the districts, the lowest ANC occurrence was observed mainly in the central part, PNC in the eastern region, SBA in 20 districts mainly of the western and eastern part. The prevalence of full immunization among the children was very high, primarily in the districts of the East region; high PNC among the children was perceived in the districts of eastern, central,

and Bundelkhand part of the state. PNC prevalence among the women was found to be highest in the western part of Uttar Pradesh.

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Introduction:-

Health is fundamental to a nation's progress in any sphere. Maternal and child health had stayed a central part of India's Family Welfare Programme since the First and Second Five-Year Plans (1951-56 and 1956-61) when the Indian Government took steps to strengthen MCH services (IIPS and Macro International, 2007). The maternal health, child health, and nutrition services were merged with family planning services as part of the Minimum Needs Programme which was commenced during the Fifth Five-Year Plan (1974-79) (IIPS and Macro International, 2007). In a nation like India, where diversity exists, for instance, cultural, social, economic, and religious, women are given high status in different religions. Despite the position, her health is not up to the mark.

Maternal healthcare encompasses healthcare amenities a mother receives during pregnancy, delivery, and post-delivery (Dairo and Owoyokun, 2010; Fatema and Lariscy, 2020). Unluckily, many of these amenities are insufficient in developing countries like India. The maternal healthcare services utilization at all stages of pregnancy and birth can diminish morbidity and mortality among mothers (Acharya et al., 2015). Mother needs special medical care during pregnancy, delivery, and after delivery; as a mother, she is more prone to adverse health outcomes or death due to the unsafe and unhygienic methods of managing pregnancy and childbirth. A newborn child needs regular health check-ups as well as nutrition supplements to avoid deficiency diseases and illness. Child health is a foundation for adult health and well-being; thus, it is imperative to ensure good health. Healthy children ensure healthy adults who, in turn, clinch good progress and development of the Country (Usmani and Ahmad, 2017). Malnutrition, mortality, and other diseases can be effortlessly prevented or treated among Newborns, predominantly infant and under-five children, who are more susceptible (Singh et al., 2017).

Refining the quality of ANC, care at the time of giving birth, and postpartum care for mothers and their newborns are all crucial to avert these losses (WHO, 2017). According to the DHS, child health denotes the period between birth and five years old when children are chiefly susceptible to disease, illness, and death (Stallings and Rebecca, 2004). As per Census 2011, the children share (0-6 years) makes 13% of the entire population of India. An expected 12.7 lakh children decease each year before completing the age of five years (NRHM, 2007). However, 81% of under-five child mortality happens in one year of birth, which constitutes for approximately 10.5 lakh infant demises, although 57% of under-five deaths occur within the first one month of life constitutes for 7.3 lakh neo-natal deaths annually in the Nation (NHM, 2007). India is one of the highly significant contributors to the yearly worldwide tally of deaths of children under five years old - almost 1.1 million (WHO, 2012). The NFHS 2015-2016 spectacles that in India, 41 infants out of 1,000 deaths in the first year of being born (Vora, 2017). Globally, closely 20% of all deaths stirring annually amongst children under five years of age are vaccine-preventable ailments. Immunization has a vital part in attaining the aims stated in the Millennium Declaration (WHO, 2012).

The WHO recommends that expectant women obtain as a minimum four antenatal care visits (Wang, Alva, Wang, and Fort, 2011). Nevertheless, only 65% of mothers in developing nations utilized ANC, equated with 97% of mommies in developed countries (Dairo and Owoyokun, 2010). SBA deals with the proper medical and health worker's services during childbirth, essential for safe delivery. The type of aid during delivery has significant consequences for both the mother and the child. Lower levels of maternal mortality are related to the presence of a skilled attendant at delivery (De Browere et al., 1998). Although the usage of SBA during childbirth has amplified universally (Adegoke and van den Broek, 2009), numerous mothers in developing countries do not give birth to their babies with the aid of skilled birth attendants (Prata et al., 2011).

Postnatal care is also necessary since complication and contamination menaces survive childbirth (Wang et al., 2011; WHO 2019). Postnatal health care includes monitoring the mother's health and newborn child's heath. It covers the regular health check-up of the mother and newborn child to ensure the safety against infectious diseases and illness. Postpartum care utilization remains low in several developing nations (Dhakal et al., 2007; WHO 2019).

According to the reports of WHO, universally, 0.53 million maternal deaths occur every year, out of which 0.12 million (22%) deaths occur only in India (Fatema and Lariscy, 2020). Additionally, millions of women suffered pregnancy-related morbidity (Nair, 2011). Despite all efforts and planning like free maternal healthcare services

introduced by the Government of India, such as Janani Shishu Suraksha Karyakaram (JSSK) and Janani Suraksha Yojna (JSY) schemes, maternal health remains a significant challenge for health care delivery organizations in the Country. According to the reports of UNICEF, India's maternal mortality rate reduced from 212 to 167 deaths per 100 thousand live births from 2007 to 2013. As 69 percent of India's entire population resides in rural areas, maternal healthcare is more worrisome in backward rural areas where the socio-economic and development activities lag (Shekhar, 2020).

Brouwere (1998) documented that no country has succeeded in getting its maternal mortality ratio below 100 per 100 thousand live births without guaranteeing that an aptly skilled health staff attends all women during and after childbirth. Bloom et al. (1999), Ram et al. (2006), and Rani et al. (2008) reveal a strong positive association between the level of antepartum care, intrapartum care, and postpartum care. Chattopadhyay (2012) documented that over 75 percent of pregnant women were deprived of three ANC check-ups. The lack of pregnancy-related information amongst the husband and other family members and a robust patriarchal set-up, where the judgments about even the women's movement are in the hands of men, were the reasons behind this deprivation. Amit Kumar (2014) endorsed a significant association of socio-demographic indicators with maternal health services utilization in India. Also, the non-nuclear family and Male out-migration positively and highly considerably associated with the usage of ANC, institutional delivery, and PNC. Furthermore, the utilization of ANC increases with an increase in the birth interval and maternal education. In urban and rural areas, ANC utilization is higher in non-nuclear families than in nuclear families.

Yadav and Dhillon (2015) found in their study that in low resources setting like Uttar Pradesh, health structure methods to improve PNC or ANC services should be prioritized with more effective counseling or advice on Family Planning to reduce unplanned births. Moreover, they showed that critical MH services (ANC, institutional delivery, PNC) utilization have effectively increased subsequent contraceptive use by 3.7%, 7.3%, and 6.8%, respectively, and have slightly reduced the unmet prerequisite for FP. Mohanty and Pathak (2009), in their study based on India and its states like Maharashtra and Uttar Pradesh, found that the rich-poor gap in child immunization, ANC, and child healthcare has widened while it has narrowed for contraception use over the years from 1992 to 2005 and the programs are barely reaching the poor sections of the society. Chauhan and Rai's (2015) study assesses the inequality in the coverage of Skilled Birth Attendance using data from NFHS-1 to NFHS-3 (1992-93, 1998-99, 2005-06). The study depicts a slow growth in SBA utilization in India and its state and urban and rural areas. The rural-Urban gap in SBA utilization, which contributes a lot in reducing maternal mortality, is more prominent in UP. The east, west, and south areas of UP have experienced a higher surge rate in SBA than the northern and central regions. Yadav and Kesarwani (2015) assessed the community factors that influence MHC services utilization in India. They found that women who obtained complete ANC were only 20.7%, whereas 41.7% obtained safe delivery care and 40.1% obtained postpartum care in two weeks of delivery. Yadav and Kesarwani (2015) also identified factors like age of women at birth, caste, parity, religion, females' education, autonomy index, family wealth index, and mass media at the individual level have a significant impact on maternal healthcare utilization. Sandhya (1991) suggested that socio-cultural factors-like caste, education, type of family, and occupation of parents, socio-economic status of the family, prenatal care, childbirth practices, and the type of medical consideration at the time of delivery define the level of infant and child mortality. Singh PK (2013) opined a decline in gender and urban-rural differences over time; however, children residing in rural parts and girls remained deprived. Furthermore, west, northeast, and south areas, which had the lowest gender inequality in immunization coverage in 1992, witnessed a rise in gender difference over time. Likewise, urban-rural inequality amplified in the west section during the year 1992–2006. This study tried to assess maternal and child health spatial patterns to comprehend the prevalence and patterns of several maternal and child health indicators.

1. To visualize the spatial patterns of maternal health across the districts of Uttar Pradesh.
2. To envisage the spatial patterns of child health through the districts of Uttar Pradesh.
3. To recognize the areas with statistically substantial clustering of high values (hot-spots) or low (cold-spots), plus spatial outliers.

Data and Methods:-
Data:
We used the data from round fourth of the National Family Health Survey (NFHS-4), a nationwide representative survey led in 2015-16. It delivers information on maternal and child health care and nutrition among the citizens of India at state or union territory level. NFHS-4, for the very first time, gathered data at the district level. The survey implemented a two-stage stratified method of sampling. Primary sampling units, i.e., the villages for rural parts and

census enumeration blocks in urban parts, were selected by the NFHS in the first stage of sampling and households in the second stage of sampling. An aggregate of 699,686 women aged 15-49 years were questioned with a response rate of XXXX. See IIPS & ICF (2017) for detailed information on sampling.

Outcome Variable:
The occurrence of complete antenatal care, skilled birth assistance, mothers' and children's postnatal care, and children's full immunization are the outcome variable. The majority of these indicators are evaluated at the district level using the data of unit level.

Analytical Procedure:
We used Local Indicator and Moran's I index for Spatial Autocorrelation (LISA) to identify the presence of spatial autocorrelation at the global and local levels, respectively. Spatial autocorrelation depicts the extent to which data points are similar or dissimilar to their spatial neighbours (Chaurasia, Srivastava, and Kumar Singh, 2020; Mishra, Kumar, and Srivastava, 2021; Sharma, Singh, and Srivastava, 2020; Srivastava, Chaurasia, Kumar Singh, and Chaudhary, 2019). Further, spatial regression identifies the factor affecting the outcome variable adjusted for the spatial effects.

Moran's I index computes the spatial auto-correlation of neighbourhood values near a particular spatial location. It represents the extent of spatial non-stationary and clustering existing in the data (Mishra et al., 2021). The formula for the calculation of Moran's I statistic is as follows:

$$\text{Univariate Moran's I} = \frac{n}{S_O} \times \frac{\Sigma_i \Sigma_j W_{ij} (x_i - \bar{X})[x_j - \bar{X}]}{\Sigma_i [x_i - \bar{X}]^2}$$

Where x shows the variable of interest and X the mean of x; n indicates the number of spatial units while Wij shows the standardized weight matrix between observation i and j with zeroes on the diagonal; and S_0 shows the collection of all spatial weights, i.e.

Values of Moran's I range between −1 (indicating perfect dispersion) to +1 (perfect correlation). A random spatial pattern is shown by zero value. Positive autocorrelation reveals that points with similitude attribute values are approximately distributed in space, while negative spatial autocorrelation reveals that closely associated points are more dissimilar.

Univariate LISA involves the computation of local Moran's I for all the sub-regions, i.e., districts. The measure $[I_i]$ is stated by the following:

$$\text{Univariate LISA: } I_i = \frac{n.[x_i - \bar{X}]}{\Sigma_i [x_i - \bar{X}]^2} \Sigma_j w_{ij} [x_j - \bar{X}]$$

Based on the four quadrants of Moran's I four types of spatial regions were generated. They are the "hot spots," i.e., the districts with high occurrence with similar neighbours also identified as "High-High," the "cold spots," i.e., the sections with low occurrence with similar neighbours also identified as "Low-Low," and the "spatial outliers," i.e., the districts with high occurrence having low occurrence neighbor districts and vice-versa.

The Queen Contiguity spatial weights, which denote whether spatial units share the boundary or not (Sharma et al., 2020), are used. If the set of boundary points of unit I is specified by the band (i), then the Queen Contiguity Weight, W_{ij} is demarcated by:

$$W_{ij} = \begin{cases} 1, & bnd(i) \cap bnd(j) \neq \emptyset \\ 0, & bnd(i) \cap bnd(j) \neq \emptyset \end{cases}$$

However, this allows spatial units to share only a single boundary point (for instance, a shared corner point on a grid of spatial units). Hence, a more necessary condition requires sharing some positive portion of their boundary (Sharma et al., 2020).

Regression models were used to examine the significant correlates of complete vaccination and PNC among children in India. To see the extent of autocorrelation in the error term the spatial ordinary least square (OLS) regression model was applied (Anselin, 1995; Anselin et al., 2006). Since spatial autocorrelation in its error term for the dependent variable is confirmed by OLS, we additionally estimated the spatial lag model (SLM) and spatial error

model (SEM) (Mishra et al., 2021). The underlying presumption of a spatial lag model is that the observations of the outcome variable are affected in the neighborhood areas. In contrast, the spatial error model is used to consider the effect of variables absent in the regression model but affect the outcome variable. The primary variation between the two models is that the spatial lag model, apart from the spatial error model, does not assess the spatial dependence of the error term (Srivastava et al., 2019).

The OLS basic equation is as follows:

$$Y = \alpha + BX + \mathcal{E}$$

Y presents the outcome variable, while X is the vector of predictor variables, and α is the model intercept, and β is the corresponding coefficient vector.

The spatial lag model propounds that the units are spatially dependent and lagging in the nearby spatial locations. A typical spatial lag model is written as follows:

$$Y_i = \delta \sum_{j \neq 1} W_{ij} Y_j + \beta X_j + \varepsilon_j$$

Here Y_i denotes the complete vaccination and PNC among children for the ith district, δ is the spatial autoregressive coefficient, W_{ij} indicates the proximity's spatial weight between district i and j, Y_j is the complete vaccination and PNC among children in the j_{th} district, while β_j means the coefficient, X_j is the predictor variable, and ε_j is the residual.

On the other hand, the spatial error model considers the omitted variables' contribution that is not considered in the model but can significantly affect the analysis (Anselin, 1995; Anselin et al., 2006). A Spatial Error Model (SEM) is written as follows:

$$Y_i = \beta X_j + \lambda \sum_{j \neq 1} W_{ij} Y_j \varepsilon_j + \varepsilon_i$$

Here, Y_i denotes the complete vaccination and PNC among children for the ith district, λ shows the spatial autoregressive coefficient, W_{ij} signifies the proximity's spatial weight between district i and j, Y_j is complete vaccination and PNC among children in the j_{th} district, while β_j shows the coefficient, X_j the predictor variable, and ε_i is the residual (Anselin, 1995; Anselin & Gallo, 2006; Anselin et al., 2006).

Results:-
Antenatal care:
Figure 1.1 depicts the district-wise full antenatal care coverage among women aged 15-49 years, where high coverage were shown by green and lowest by red. The lowest coverage was detected in Etawah, Auraiya, Kannauj, Kanpur Dehat, Hardoi, Unnao, Sitapur, and Kheri districts of Central Uttar Pradesh; Manipuri, Mathura, Kanshiram Nagar districts of Western Uttar Pradesh; Lalitpur, Hamirpur, Banda, Chitrakoot districts of Bundelkhand region; and Fatehpur, Kaushambi, Pratapgarh, Bahraich, Sravasti, Balrampur, Gonda districts of Eastern Uttar Pradesh while the highest in Kanpur Nagar, Lucknow districts of Central Uttar Pradesh; Saharanpur, Muzaffarnagar, Baghpat, Meerut, Ghaziabad, Gautam Buddha Nagar, Bareilly, Pilibhit and Agra districts of Western Uttar Pradesh; Maharajaganj. Kushinagar, Gorakhpur, Sonbhadra, Chandauli, Varanasi, St. Ravidas Nagar, and Allahabad districts of Eastern Uttar Pradesh. Moran's I = 0.291 depicts a significant autocorrelation. Full ANC has high-high spatial association in Muzaffarnagar, Baghpat, Meerut, Ghaziabad districts of Western Uttar Pradesh and Mirzapur district of Eastern Uttar Pradesh whereas low-low in Farrukhabad and Auraiya districts of central Uttar Pradesh and Jalun, Banda and Chitrakoot districts of Bundelkhand region and Bahraich, Sarawasti, Balrampur and Gonda districts of Eastern Uttar Pradesh.

Postnatal care:
Figure 2.1 illustrates the district-wise coverage of postnatal care coverage among women aged 15-49 years, where high coverage were shown by green and lowest by red.
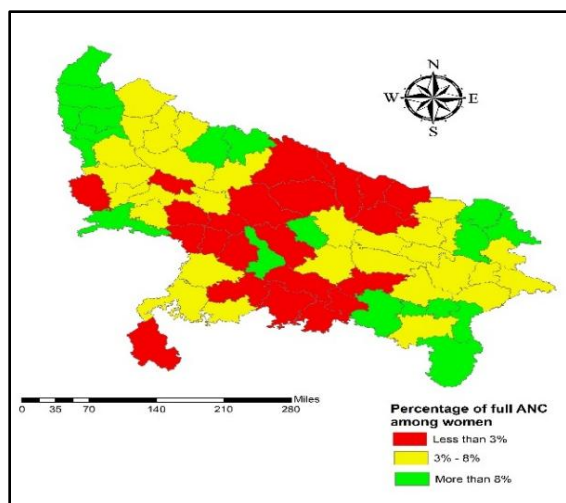
Fig 1.1 Percentage of women getting full Ante-natal
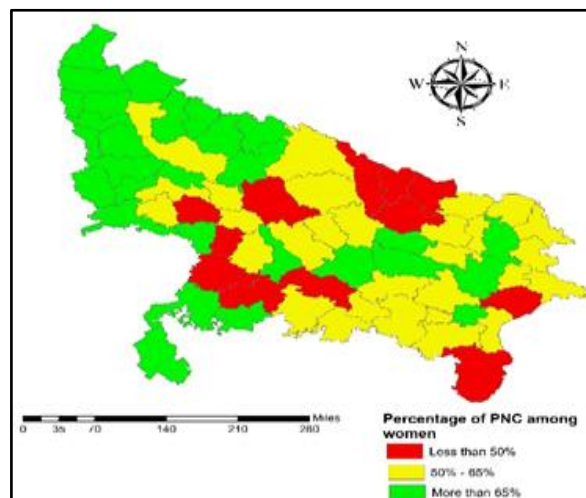care in districts of Uttar Pradesh

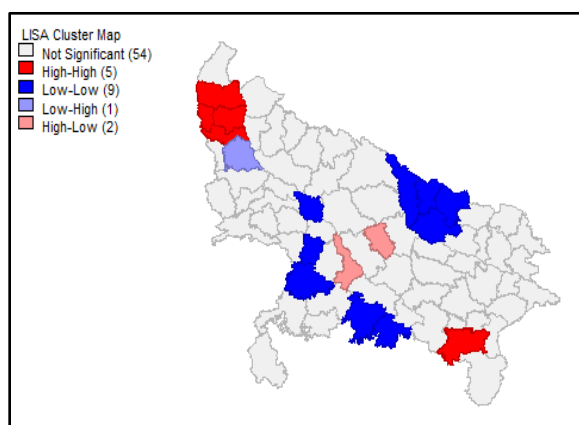Fig2.1 Percentage of women getting full postnatalcare by
districts

Fig. 1.2 Univariate LISA cluster map for full Ante-natal
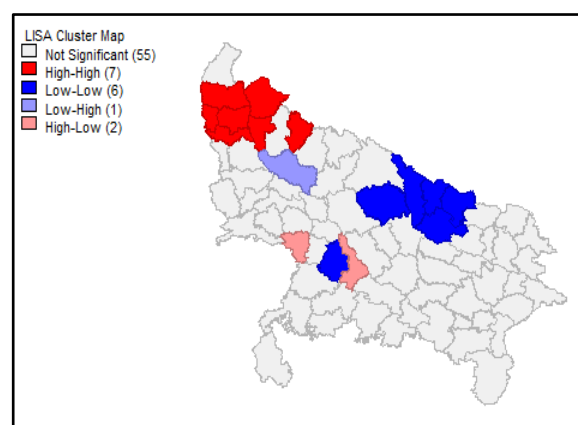care by districts

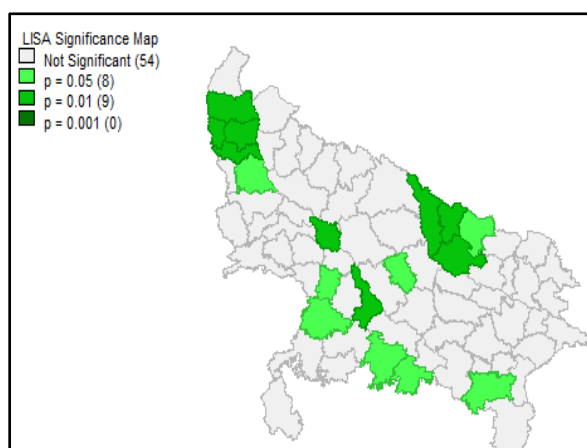Fig. 2.2 Univariate LISA cluster map for fullpostnatal care
by districts

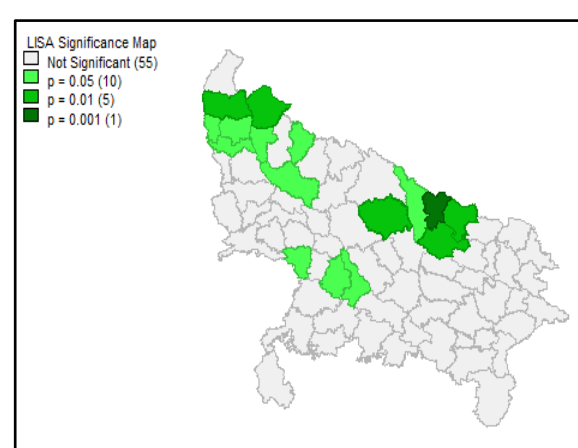Fig. 1.3 Univariate LISA significant map for full Ante-natal
care by districts

Fig. 2.3 Univariate LISA significant map for fullpostnatal
care by districts

The lowest coverage was observed in Auraiya plus Hardoi regions of central Uttar Pradesh; Mainpuri district of western Uttar Pradesh; Jalaun and Hamirpur districts of Bundelkhand region; Sonbhadra, Ghazipur, Bahraich,

Sravasti, Gonda, Balrampur, and Fatehpur districts of eastern Uttar Pradesh while the highest in Raebareli, Kanpur Nagar, and Etawah districts of central Uttar Pradesh; Azamgarh, Varanasi, Gorakhpur, Sultanpur, and Faizabad districts of eastern Uttar Pradesh; Lalitpur, Jhansi, and Mahoba areas of Bundelkhand region; the majority of the western Uttar Pradesh districts has the highest coverage of PNC. Moran's I = 0.426 depicts a significant autocorrelation. Full PNC has a high-high spatial association in Muzaffarnagar, Baghpat, Meerut, Ghaziabad, Bijnor, Jyotiba Raophule Nagar, Rampur districts of Western Uttar Pradesh whereas low-low in Kanpur Dehat and Sitapur districts of Central Uttar Pradesh and Bahraich, Sarawasti, Balrampur, and Gonda districts of Eastern Uttar Pradesh.

Skilled Birth Attendant (SBA):
Figure 3.1 portrays the district-wise coverage of SBA coverage among women aged 15-49 years, where high coverage were shown by green and lowest by red. The lowest coverage was witnessed in Kheri, Barabanki, Farrukhabad, Kannauj, and Hardoi districts of central Uttar Pradesh; Sonbhadra, Maharajganj, St. Kabir Nagar, Siddharth Nagar, Bahraich, Sravasti, Gonda, Balrampur districts of eastern Uttar Pradesh; Shahjahanpur, Mainpuri, Etah, Kanshiram Nagar, Budaun, Bareilly, and Rampur districts of western Uttar Pradesh while the highest in Raebareli, Kanpur Nagar, and Lucknow districts of central Uttar Pradesh; Azamgarh, Varanasi, Pratapgarh, St. Ravidas Nagar, Deoria, Mau and Ambedkar Nagar districts of eastern Uttar Pradesh; Lalitpur, Jhansi, Jalaun, Hamirpur and Mahoba areas of Bundelkhand region; Baghpat, Agra, Mathura and Mahamaya Nagar of western Uttar Pradesh. Moran's I = 0.554 depicts a significant autocorrelation. SBA has a high-high spatial association in Ghazipur, Azamgarh, Jaunpur, and Sultanpur districts of Eastern Uttar Pradesh and Lalitpur, Jhansi, Mahoba, Jalaun, Hamirpur, and Banda districts of Bundelkhand region, whereas low-low in Farrukhabad, Sitapur, and Kheri districts of Central Uttar Pradesh and Bahraich, Sarawasti, Balrampur, Siddhartha Nagar and Gonda districts of Eastern Uttar Pradesh and Pilibhit, Shahajahanpur and Budaun districts of Western Uttar Pradesh.

Full Immunization:
Figure 4.1 depicts the district-wise coverage of full immunization coverage amongst children aged 12-23 months, where high coverage were shown by green and lowest by red. The lowest coverage was perceived in Sitapur, Hardoi, Farrukhabad, Kannauj, Auraiya, Kanpur Nagar, and Barabanki districts of central Uttar Pradesh; Bareilly, Moradabad, Etah, and Kanshiram Nagar of Western Uttar Pradesh; the majority of the eastern Uttar Pradesh districts lies in this category while the highest in Saharanpur, Muzaffarnagar, Meerut, Baghpat, Ghaziabad, Bijnor, Gautam Buddha Nagar, Pilibhit, Shahjahanpur, Aligarh, Rampur, Jyotiba Rao Phule Nagar, Mahamaya Nagar and Agra districts of Western Uttar Pradesh; Deoria, Gorakhpur, Ambedkar Nagar districts of Eastern Uttar Pradesh; Kanpur Dehat, Lucknow, and Raebareli districts of central Uttar Pradesh; Lalitpur, Jhansi, Mahoba and Chitrakoot districts of Bundelkhand region. Moran's I = 0.344 depicts a significant autocorrelation. Full immunization has a high-high spatial association in Muzaffarnagar, Baghpat, Meerut, Ghaziabad, Bulandshahr, and Bijnor districts of western Uttar Pradesh, whereas low-low in Sitapur district of central Uttar Pradesh and Bahraich, Sarawasti, Balrampur, Siddhartha Nagar, and Gonda districts of Eastern Uttar Pradesh.
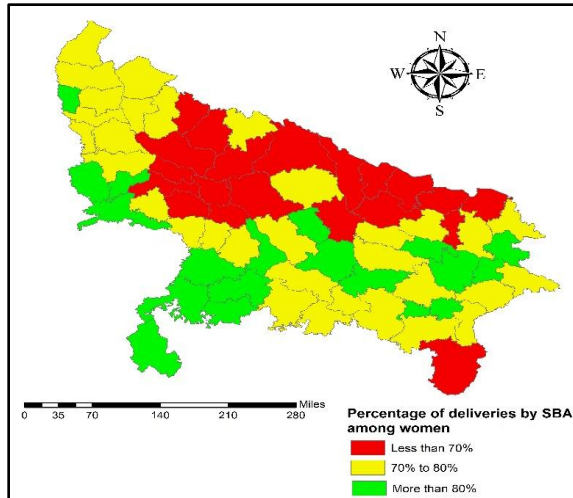
Fig3.1 Percentage of women delivered by Skilled BirthAttendant in districts of Uttar Pradesh
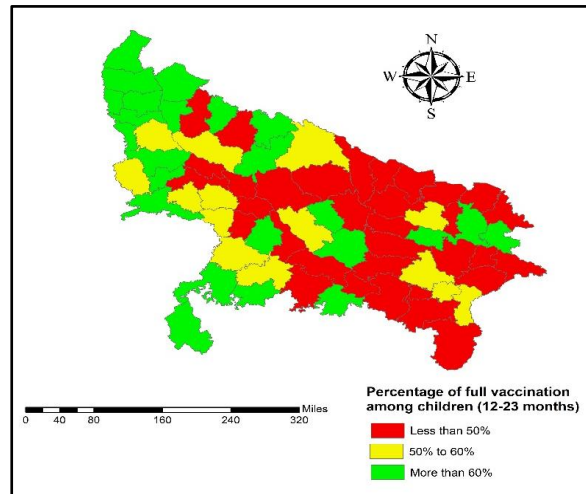

Fig. 4.1 Percentage of children aged 12-23 months getting full Immunization by districts
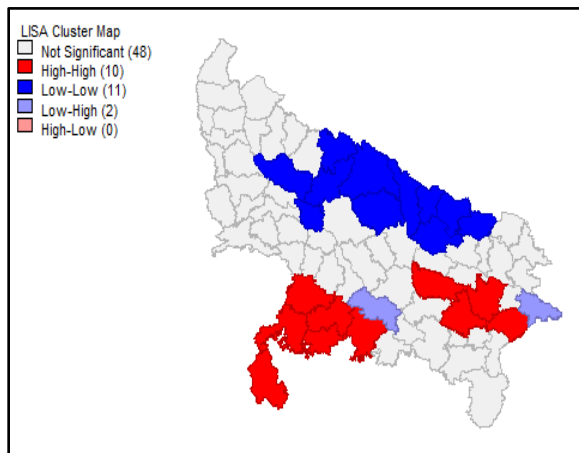

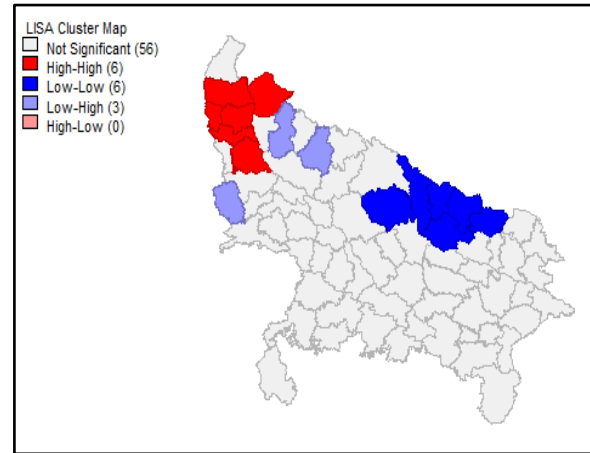Fig3.2Univariate LISA cluster map for delivery by Skilled Birth Attendant by districts

Fig4.2Univariate LISA cluster map for full immunization among children aged 12-23 months by districts
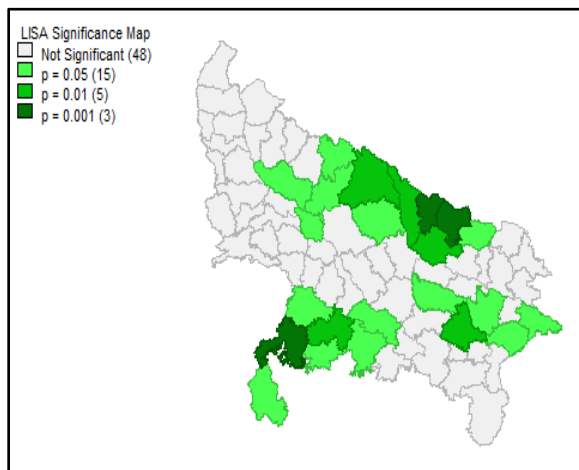

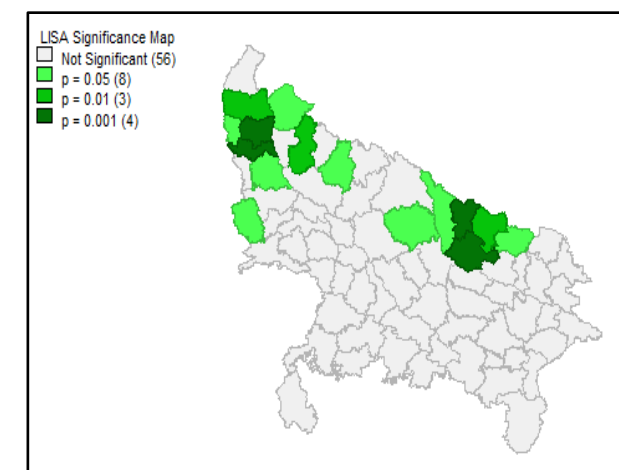Fig3.3Univariate LISA significant map for delivery by Skilled Birth Attendant by districts

Fig. 4.3Univariate LISA significant map for full immunization among children aged 12-23 months by districts

Postnatal care:

Figure 5.1 depicts the district-wise coverage of postnatal care coverage among children aged 12-23 months, high coverage were shown by green and lowest by red. The lowest coverage was detected in Kheri, Hardoi, Kannauj, Auraiya, Kanpur Dehat, Barabanki districts of central Uttar Pradesh; Mainpuri district of western Uttar Pradesh; Lalitpur, Jalaun, Hamirpur, Mahoba, and Banda districts of Bundelkhand region; Sonbhadra, Deoria, Kushinagar, Ghazipur, Azamgarh, Jaunpur, Sultanpur, Pratapgarh, Baharaich, Sravasti, Balrampur, Gonda, Siddhartha Nagar, and Basti districts of Eastern Uttar Pradesh while the highest in Saharanpur, Muzaffarnagar, Baghpat, Meerut, Ghaziabad, Aligarh, Moradabad, Rampur, Bareilly, Pilibhit, Shahajahanpur, and Budaun districts of western Uttar Pradesh. Moran's I = 0.621 depicts a significant autocorrelation. Postnatal care has a high-high spatial association in Muzaffarnagar, Baghpat, Meerut, Ghaziabad, Bulandshahr, Rampur, Moradabad, Bareilly, Jyotiba Rao Phule Nagar, and Bijnor districts of western Uttar Pradesh, whereas low-low in Jhansi, Jalaun, Hamirpur, Mahoba, Banda districts of Bundelkhand region and Kanpur Dehat, Barabanki, Sitapur, Raebareli districts of central Uttar Pradesh and Bahraich, Sarawasti, Balrampur, Siddhartha Nagar, Faizabad and Gonda districts of Eastern Uttar Pradesh.
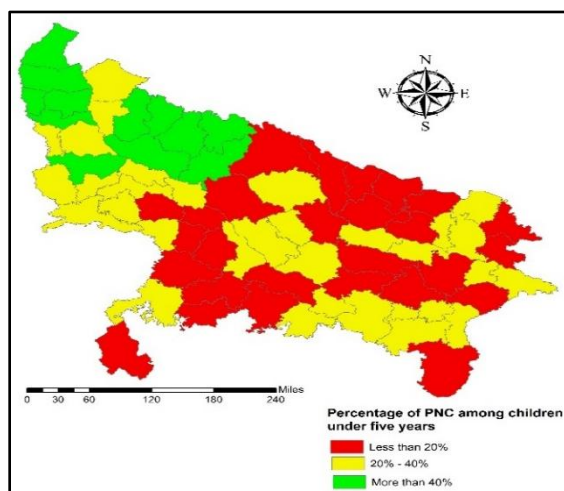

Fig 5.1 Percentage of children getting post-natal care in districts of Uttar Pradesh
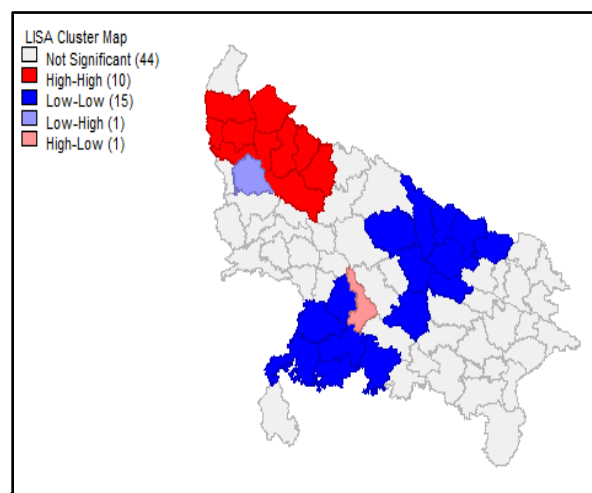
Fig5.2Univariate LISA cluster map for postnatal careamong children aged 12-23 months by districts
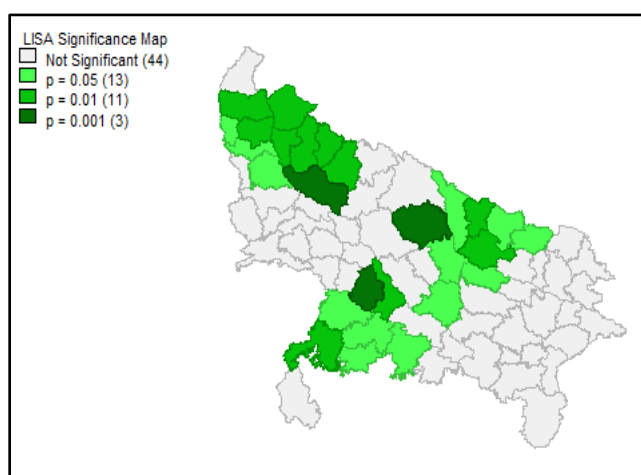
Fig5.3Univariate LISA significant map for postnatal careamong Children aged 12-23 months by districts

Discussion:-

This analysis offers a quantitative valuation of maternal and child health across 75 districts of Uttar Pradesh. Also, it delivers a statistical intra assessment of relatively high and low-performing regions concerning proximal geographical parts. District-level exploratory spatial data analysis results for each indicator were done, and they

were represented in maps as spatial clusters. Those clusters were further characterized in terms of the relationships amid neighboring districts, high-high values, high-low values, low-high values, and low-low values. Low-low spatial association was found in Farrukhabad and Auraiya districts of central Uttar Pradesh and Jalaun, Banda and Chitrakoot districts of Bundelkhand region and Bahraich, Sarawasti, Balrampur and Gonda districts of Eastern Uttar Pradesh for ANC; Kanpur Dehat and Sitapur districts of Central Uttar Pradesh and Bahraich, Sarawasti, Balrampur and Gonda districts of Eastern Uttar Pradesh for PNC; Farrukhabad, Sitapur and Kheri districts of Central Uttar Pradesh and Bahraich, Sarawasti, Balrampur, Siddhartha Nagar and Gonda districts of Eastern Uttar Pradesh and Pilibhit, Shahajahanpur and Budaun districts of Western Uttar Pradesh for SBA; Sitapur district of central Uttar Pradesh and Bahraich, Sarawasti, Balrampur, Siddhartha Nagar and Gonda districts of Eastern Uttar Pradesh for full immunization; Jhansi, Jalaun, Hamirpur, Mahoba, Banda districts of Bundelkhand region and Kanpur Dehat, Barabanki, Sitapur, Raebareli districts of central Uttar Pradesh and Bahraich, Sarawasti, Balrampur, Siddhartha Nagar, Faizabad and Gonda districts of Eastern Uttar Pradesh for PNC among children aged 12-23 months.

The high-high spatial association was found in Muzaffarnagar, Baghpat, Meerut, Ghaziabad districts of Western Uttar Pradesh and Mirzapur district of Eastern Uttar Pradesh for ANC; Muzaffarnagar, Baghpat, Meerut, Ghaziabad, Bijnor, Jyotiba Raophule Nagar, Rampur districts of Western Uttar Pradesh for PNC; Ghazipur, Azamgarh, Jaunpur and Sultanpur districts of Eastern Uttar Pradesh and Lalitpur, Jhansi, Mahoba, Jalaun, Hamirpur and Banda districts of Bundelkhand region for SBA; Muzaffarnagar, Baghpat, Meerut, Ghaziabad, Bulandshahr and Bijnor districts of western Uttar Pradesh for full immunization; Muzaffarnagar, Baghpat, Meerut, Ghaziabad, Bulandshahr, Rampur, Moradabad, Bareilly, Jyotiba Rao Phule Nagar and Bijnor districts of western Uttar Pradesh for PNC amongst children aged 12-23 months.

Conclusion:-
This study has visualized the spatial pattern of MCH services among the different districts of Eastern Uttar Pradesh. All the indicators portrayed prominent coverage variation through the states of Uttar Pradesh. Among all the Uttar Pradesh states, the lowest occurrence of ANC was perceived mainly in the central part; PNC in the eastern region; SBA in 20 districts mainly of the western and eastern part. The prevalence of full immunization among the children was very high, mainly in the districts of the East region; high PNC among the children was experiential in the communities of eastern, central, and Bundelkhand parts of the state. Amongst the women of the western part of Uttar Pradesh, PNC prevalence was highest.

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