HEALTH CONDITION OF PEOPLE LIVING WITH HIV/ AIDS USING MULTIVARIATE ANALYSIS FOR PUBLIC HEALTH PLANNING

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Health maps have become widespread. The increased availability of local health data, the development of software solutions, progress in computer capabilities, and a growing interest in health inequalities have promoted the rising profile of health mapping. The present study aims to analyze the spatial distribution of people living with HIV/AIDS and their relationship between social, cultural, psychological and health condition. The available heath care facilities and the demographic characteristics of the general population of the Palakkad district is analysed. These are altogether very important aspects for the identification of the problems in association with public health requirement, degree of development and planning for the people living with HIV/AIDS in the districts of Kerala State. The multivariate statistical technique of factor analysis is applied to study the multi dimensional inter related variables included in the research study .Based on analysis the Eigen value 6.49 is considered as a yardstick to extract 10 factors and the same are resolved owing to the fact that almost all the variables got loaded with these factors. The 10 factors explain altogether 89.58% of the total variance with each one of its value ranging from 6.49% to 12.31 %. Though the components selected as 10 factors, it is pertinent to note the fact that first 5 primary factors that have more than 8.93 Eigen values alone totally explain 53.84 % of total variance whereas the remaining 5 factors recorded with more than

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6.49-7.61 value. Eigen values altogether explain only 35.74 % of the total variance. Spatial distribution of people living with HIV/AIDS and their relationship between social ,cultural, psychological and health condition are considered for the present analysis and identified the problematic region in the block level i.e. Pattambi, Sreekrishnapuram and Attapadi block. Moderate of HIV/AIDS related problems identified from Alathur,Malampuzha, Palakkad and Mannarkkad.Blocks with low HIV/AIDS related problems are Kollamgode and Kuzhalmannam. Blocks with very low HIV/AIDS related problems are Chittur, Nenmara, Thrithala and Ottapalam. This will be ready to lend hand for a sustainable planning to the future.

Key words- Eigen value , Health map ,multivariate analysis, PLHA, spatial distribution

Health maps have become widespread. The increased availability of local health data, the development of software solutions, progress in computer capabilities, and a growing interest in health inequalities have promoted the rising profile of health mapping. There are now so many health atlases permitting, at national, regional, or local level, the study of health disparities. .Disease maps mainly concern the spatial distribution of one disease, however an important question is: how, in the same space, do various diseases combine? This question has received little attention . Multivariate techniques allow us to classify areas according to their similarities on various health indicators. Statistical approaches like simple or multiple linear regressions allow us to look at relationships between variables. Mapping the residuals from these analyses enables us to identify particular places that do not conform to general trends . This analytical approach to mapping can reveal additional variables for study or combinations of factors specific to particular places. Residuals from multilevel analyses allow the analysis of these matters at various scales.

Public health is increasingly becoming a multi-sector and multilevel responsibility, and there is a need for a comprehensive community and spatial planning to integrate health considerations and develop a sustainable public health policy. Health care Planning as a tool in the policymaking process, and, in accordance with the understanding of policy-making as an ongoing process, planning is understood as a circular process .Health care planning model represents a systematic and comprehensive, long-term approach to public health planning in the people living with HIV/AIDS, and High Risk Group communities the model is a systematic approach in six steps, linked together in a circle with a dynamic character. The circle follows a planning period of 4 years. The aim is to show, step by step, how a plan where health and well-being aspects are highlighted can

be carried out and embedded in the ordinary planning of the district. The health care planning to people living with HIV/AIDS have different stages of the circular process as follows.

Location of the study area

Palakkad district is Situated at the foot of western ghats, this is the gateway of Kerala from north. Palakkad district is placed between 10°20′ N to 11°14′ N latitude and 76°20′ E to 76°54′ E longitude. The district shares borders with Malappuram district in the North and Northwest, Thrissur in the South and Southwest and Coimbatore district of Tamil Nadu in the East. Out of the 14 districts of Kerala, Palakkad is one of the five districts which does not have a coastline. Its geographical position, historical background, rural nature, educational status, tourist attractions and above all, the developmental activities are wide and varied.

There are thirteen Development blocks and four Municipalities in the district. Ninety one Panchayats are grouped to form the thirteen blocks.

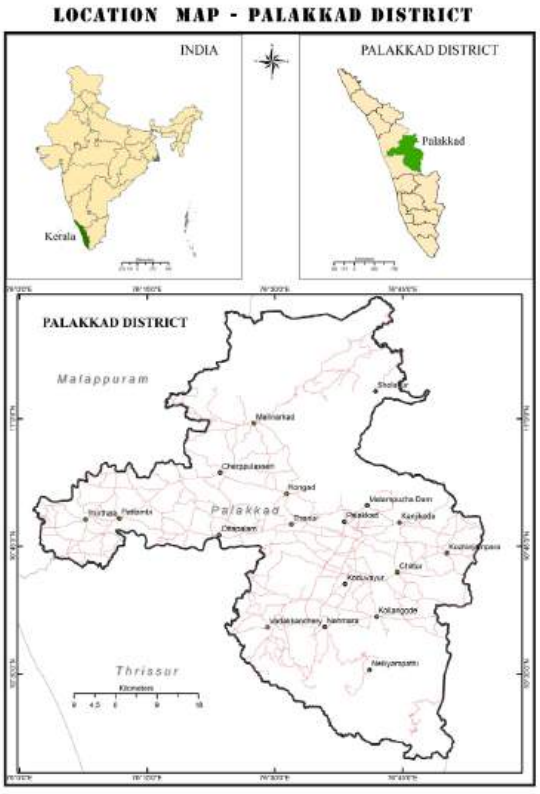

Figure 1-1

Aim and Objectives

The present study aims at attempting a Spatio- temporal analysis of HIV / AIDS in Palakkad district in Kerala State. The following are the major objective of the present investigation.

1. To identify living environmental condition of people living with HIV/AIDS and Knowledge about Sex, Practice and Behavior.
2. To identify the problems related to Social, Psychological, Health and the Availability, Accessibility , Affordability of Health Care Facilities:
3. To identify major problems of the people living with HIV/AIDS and the Spatial disparity in the distribution and control of the spread of HIV /AIDS .

Methods

The present study based on both Primary and Secondary data. Secondary data is collected from Governmental and quasi Govt agencies .In order to collect relevant secondary data for the study the respective sources have been taped .Population data collected from Census publication and department of Economics and Statistics Thiruvanathapuram. The health statistics consisting of morbidity of disease and health care facilities have been collected from health directorate and office of the chief medical officer of the district.

The secondary data includes the enrolment of the People Living with HIV/ AIDS (casualty sheets) registers of Pratiasa Centers, registers of NGOs i.e. Council of People Living With HIV/AIDS (CPK+) Published information collected from the Govt organization like National AIDS Control Organization (NACO), Kerala State AIDS Control Organization (KASACS). National AIDS Control Organization (NACO) surveillance report and Kerala State Surveillance report, UNAIDS surveillance report also collected. Council of People Living with HIV/AIDS (CPK+) enrollment are collected from 2004 onwards.

Random sampling method is applied for primary data collection from the Pratyasa centers and Council of people living with HIV/AIDS in Palakkad district. For this purpose total reported cases up to 2010-11 year are considered for the present study . In random sampling 20 percent of the reported cases in Pratyasa Centres in Palakkad districts are well thought-out. Here 180 samples are collected for the investigation by using elaborate questionnaire. To collect the information required for the study a structured interview schedule was prepared. Before structuring the interview schedule discussions were held with a few People living with HIV/AIDS. In the preparation of the interview schedule, Health survey

schedules used earlier, were consulted. Before the final survey, a pilot survey was carried out.

A structured pre tested questionnaire is used to collect reliable information from the HIV/AIDS persons. The finalized questionnaire is translated into the regional languages. The questionnaire was retranslated in English to ensure that the implications of the questions did not lose while translating in to regional languages. The bilingual questionnaires were also used for collecting information. This questionnaire consist of 45 questions, consists of ten variables. The survey, along with participant observation and interviews with key informants, was carried out during the period 1st March, 2010 to 28th June 2011.During the survey special attention was given to establish good rapport with the AIDS patients by explaining them the purpose of the study and assured them to protect their personal identity without dissimilation of the data .This step was very important to obtain reliable information because some AIDS patients might tend to provide incorrect information if they felt that the interviewers were not helpful.

AIDS patients were interviewed in isolation from their friends / family members during the interview, to make sure that the answers would not be affected by arbitrary responses from people around them .AIDS patients were also assured that the information they released would remain strictly confidential. The collected data has been analysed both descriptively and inferentially. The following specific statistical techniques have been adopted for the study. Simple statistical techniques are used for the data analysis. Percentage analysis are used to ascertain the perception of the people living with HIV/AIDS .Statistical Packages for Social Science (SPSS 16.0) are used to find out the problems of people living with HIV/AIDS. The multivariate statistical technique of factor analysis is applied to study the multi dimensional inter related variables included in the research study .Based on analysis tables and maps were prepared and conclusions drawn. Computer based cartographic technique is used to show the disparity in the spatial pattern and variation of HIV /AIDS infected people in the fourteen districts of Kerala State. Arc GIS 9.3 is used to analyze and prepare maps for future planning to the Govt organizations.

Results and discussions

The present study aims to analyze the spatial distribution of people living with HIV/AIDS and their relationship between social, cultural, psychological and health condition. The available heath care facilities and the demographic characteristics of the general population of the study area are considered. These are very important aspects for the identification of the problems in association

with public health requirement, degree of development and planning for the people living with HIV/AIDS in the districts of Kerala state. On the basis of the discussions 72 variables selected for the statistical analysis. They are the information collected from the primary survey of the People Living with HIV/AIDS in the major 8 subdivisions consists of 62 variables such as the Personal status and Living environmental conditions, Awareness of HIV/AIDS and Source of infection, Knowledge about Sex, Practice and Behaviour, Usage of preventive tools, Social, Psychological and opportunistic disease related health problems. Availability, accessibility and affordability of health care facilities and Role of NGO and Government towards HIV/AIDS prevention.

The secondary base 10 variables of the health care facility includes service infrastructural indicators such as health care services such as number of health centres, health centre density index, number of doctors, number of beds, availability of beds in hospitalas,number of welfare centre, family welfare centre, health centre density, health index literacy rate. The entire interrelated variable in the data matrix of 13 x 72 is used for statistical analysis.

Table 1.1 Data set of People Living with HIV/AIDS

1	Male	11	High school level of education
2	Female	12	Higher secondary level of education
3	20-29 Age group	13	Unskilled worker
4	30-39 Age group	14	Truck and Auto drivers
5	Marital status –Single	15	Unemployed
6	Marital status –Married	16	House wife
7	Hindu	17	Monthly income <2000 rupees
8	Muslim	18	Marital life span 5--10 years
9	Christian	19	Stay with family
10	4 to 6 members in the family	20	PLHA are out of station7 -14 days
II	**Awareness of HIV/AIDS and Source of Infection**		
21	HIV/AIDS as Treacherous disease	25	HIV/AIDS Transmitted trough mother to child
22	HIV/AIDS transmitted through Sexual contact	26	Confirmation of HIV/AIDS 3-6 years
23	HIV/AIDS transmitted through drug abuse	27	personal disagreeable at the time of HIV/AIDS test
24	HIV/AIDS transmitted through unsterilized syringe	28	Reveal test result to the partner

III	**Knowledge about Sex and Practice**		
29	Knowledge about sex from books	33	PLHA have Homosexuality
30	Knowledge about sex from friends	34	PLHA have habit of visit sex workers
31	PLHA have Sex before marriage	35	PLHA have Anal intercourse
32	PLHA Age of first sexual intercourse 15-25 age group	36	Primary cause of AIDS is STD
IV	**Usage of Preventive Tools**		
37	Partner prevents Condom	40	Anal intercourse
38	Insisted condoms by partner	41	Due to unpleasant staff unable to purchase condom
39	Insisted condom	42	PLHA getting Condom freely
VI	**Social and Psychological Health Problems of HIV/AIDS Infected Persons**		
43	PLHA bothered about family members getting HIV/AIDS	49	PLHA suffer loss of weight
44	Separated from the family	50	PLHA suffer Fever
45	PLHA Isolated due to HIV/AIDS	51	PLHA suffer Headache
46	PLHA Dejection due to HIV/AIDS	52	PLHA suffer Night sweat
47	PLHA suffer disease daily	53	PLHA suffer Oral thrush
48	PLHA suffer Fatigue	54	PLHA suffer Tuberculosis
IX Availability ,Accessibility and Affordability of Health Care Facilities to the Infected Persons			
55	ART treatment free	57	PLHA ART treatment access is difficult
56	PLHA Treatment receiving from Govt hospital	58	Getting nutritious food
59	PLHA Satisfied the work of NGO	61	PLHA not satisfied the GOVT agencies role to control HIV/AIDS
60	PLHA getting moral help from NGO	62	Medical practitioner visited PLHA home
X	**Demographic Characteristics (Secondary data base)**		
63	Number of Health centres	68	No. of Welfare Centre
64	Health centre density index	69	Family Welfare Centre/000 population
65	No of doctors per 1000 population	70	Health centre density/10sq.km
66	No of Beds	71	Health Index
67	Availability of Beds in Hospitals	72	Literacy rate

The component scores calculated for each observation unit area will show the spatial variation. The positive and negative scores pertaining to each component are developed with respect to each spatial unit in the study and they help us to evaluate the problematic region with reference to each index. On the basis of the sign of the scores as positive and negative, the development index is classified into four types. The score value 1 and above is considered as high positive and negative development. The value less than one in both directions are treated as less development on the negative and positive sides.

HIV/AIDS related variables Relationship and Factor Solution:

The extraction of table 1.2 illustrate the total variance explained by the variables included in the analysis .The distribution of Eigen values and the total percentage and cumulative percentage variance of each one of the factor solution is presented in table1.2, it is pertinent to note that13 factors with6.43 rotated Eigen vector values explains100% of the variance in the data set. The factor loading of each one of all the 72 HIV/AIDS related variables are item wise listed in table 1.2 .

The Eigen value 6.49 is considered as a yardstick to extract 10 factors and the same are resolved owing to the fact that almost all the variables got loaded with these factors. The 10 factors explain altogether 89.58% of the total variance with each one of its value ranging from 6.49% to 12.31 %. Though the components selected as 10 factors, it is pertinent to note the fact the first 5 primary factors that have more than 8.93 Eigen values alone totally explain 53.84 % of total variance whereas the remaining 5 factors recorded with more than (6.49-7.61). Eigen values altogether explain only 35.74 % of the total variance. In fact, among the first 3 primary factors the first component alone with its Eigen value 34.52 explain highest amount of total variance that is about 10.82% followed by the rest of 7 factors that explain the total variance of around 6.49 % viz the second component (11.39 %), third (10.82 %) fourth(10.39%) and fifth 8.93%. These entire 5 variables explain 53.84% of the total variance of the data set.

Table 1.2 Total variance explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.28	15.43	15.43	15.28	15.43	15.43	12.19	12.31	12.31
2	14.29	14.44	29.87	14.29	14.44	29.87	11.27	11.39	23.70

3	11.84	11.96	41.83	11.84	11.96	41.83	10.71	10.82	34.52
4	10.28	10.38	52.21	10.28	10.38	52.21	10.29	10.39	44.91
5	8.89	8.98	61.19	8.89	8.98	61.19	8.84	8.93	53.84
6	7.45	7.52	68.71	7.45	7.52	68.71	7.53	7.61	61.45
7	7.25	7.32	76.03	7.25	7.32	76.03	7.43	7.51	68.95
8	6.22	6.28	82.31	6.22	6.28	82.31	7.36	7.44	76.39
9	5.50	5.55	87.87	5.50	5.55	87.87	6.63	6.70	83.09
10	4.76	4.80	92.67	4.76	4.80	92.67	6.43	6.49	89.58
11	4.06	4.11	96.78	4.06	4.11	96.78	5.42	5.47	95.05
12	3.19	3.22	100.00	3.19	3.22	100.00	4.90	4.95	100.00

The remaining 5 factors, all of them have more than 4 Eigen values and they altogether explain little less than 35.74 % of total variance. However it is to be further noted that these factors are strongly loaded with the following group of highly related variables that are considered in the analysis.

Major Factors and their Variable Loadings

The first component which explains 12.31 % of the total variance is significantly loaded with 22 variables (see table 6.3).The factor loading positive values of 11 variables lies between (0.93 to 0.45) in both the directions. MLHA Partner prevent condom usage with sexual intercourse (0.93), MLHA got Moral support from NGO (0.76), HIV /AIDS transferred to Mother to Child (0.62), FLHA separated from family (0.59), MLHA Married (0.59), High school level of education (0.59) MLHA suffered fever (0.56) MLHA reveal test to partner (0.56) FLHA got HIV/ AIDS through Sexual contact (0.48) MLHA suffered TB (0.45) FLHA age group of 30-39 (0.45)

The 11 variables with negative loadings are added with Partner prevents condom usage (-0.94) MLHA protect HIV themselves-0.93, MLHA receiving nutritious food-0.82, MLHA got HIV through Drug Abuse-0.68, FLHA isolated-0.61, FLHA have anal intercourse-0.55, MLHA have the age group of 30-39(-0.49), FLHA got HIV from Mother to Child transmission-0.48, No of Beds in the hospitals-0.45 MLHA collect the sex knowledge from Friends-0.45 MLHA living as single-0.44

Hence this 1st component is named as Dimension of Variation of the PLHA and their awareness and Sexual practice, Preventive tools and Psychological Problems Hence it is hypothesised that PLHA and their sexual knowledge and awareness is the major route of the HIV/AIDS infection.

The 2nd component which accounts for 11.39% of the total variance includes 20 variables with strong loading values between 0.94 and 0.44 in both the directions.

Among the 25 variables 16 show positive values of loading such as Health centre density index0.94, Health centre density/10sq.km0.94 No of doctors per 1000 population0.88 Health Index0.80 Number of Health centers0.73 FLHA receiving nutritious food(0.64) 5—10 (0.60), MLHA suffered headache0.56, self insisted condom 0.53, Mother to Child transmission of HIV/AIDS0.50 ,Literacy rate0.50, MLHA not satisfied the work of Govt0.48, MLHA have sexual intercourse in the period of 15—25(0.46) FLHA have anal intercourse0.46, MLHA satisfied the work of NGO0.42, FLHA taking ART0.41,

The negatively loaded factors are FLHA as Christian-0.71, Male sex before marriage-0.54, FLHA Partner prevents condom usage-0.53, MLHA High school level education-0.48, MLHA have sex in the age group of 15—25(-0.46) MLHA are Unemployed(-0.45) MLHA are Christian community-0.44.In total (5) variables are included under this dimension explained the characteristic of the general Heath care facility and accessibility and sexual knowledge and practice. Hence this component is named as Dimension of Health care facility and Availability of HIV/AIDS treatment

Availability of health care facility and affordability of treatment is the major constraints of the PLHA in Palakkad. Hence it is hypothesised that low level of literacy, poor socio-economical status unemployment in rural and migration played a dominant role in the spread of disease in the grass root level.

The 3rd component accounts 10.82% of total variance with positive loading values of 8 variables (0.85-0.43) and 13 variables with negative loadings (-0.69 to-0.44). The variable such as MLHA belongs to Muslim community0.85 ,Access is difficult0.83, MLHA receiving treatment from Govt hospitals0.76, MLHA taking ART0.71, MLHA got HIV /AIDS through Sexual contact0.6, Friends0.63, FLHA have anal intercourse0.56, MLHA know that HIV is a Infectious disease0.44, FLHA receiving nutritious food0.44, FLHA have first sexual relationship at the age group of (15-25) 0.44, MLHA Partner prevents condom usage 0.43,are loaded with positive direction.

While negatively loaded variable is MLHA belongs to Hindu community-0.69, MLHA visited sex workers home-0.64, FLHA separated from the family-0.63, MLHA separated from family-0.59, HIV/AIDS is a Infectious disease-0.53, MLHA believes the support of NGO-0.53, 1--3 year-0.52, FLHA suffered headache-0.49, MLHA have Higher secondary level of education-0.47, MLHA have Dejection due to HIV-0.45, MLHA infected HIV through Drug Abuse-0.44.

All these 24 factors invariably cluster and explained Availability and accessibility of ART treatment and role of NGO and Govt .Therefore this component

is rightly called as Dimension of Availability and accessibility of ART treatment and role of NGO and Govt . Therefore it is hypothesised that accessibility and awareness about HIV/AIDS is very low in the Palakkad district.

In the 4th component exhibit the total variance of 10.39% is contributed by 19 variables .The positive loading 9 variable factors lying between 0.91 and 0.41 in both the directions. Among them, Availability of Beds in Hospitals 0.91, MLHA frustrated due to HIV/AIDS infection0.73, Involvement 0.71,MLHA have anal inter course0.68, FLHA infected HIV/AIDS through Sexual contact0.64, FLHA have High school level of education0.53, No of Beds0.48, FLHA taking ART0.41 MLHA have 4—6 members in the family0.41.

Of the remaining 10 negative variables are namely people living with HIV/AIDS have Availability of Beds in Hospitals0.91 MLHA frustrated due to HIV/AIDS infection0.73, MLHA have anal inter course0.68,FLHA infected HIV/AIDS through Sexual conta0.64 ,FLHA have High school level of education0.53, No of Beds0.48, FLHA taking ART0.41, MLHA have 4--6 family members0.41.

This component is conveniently stated as Psychological problems of the HIV/AIDS infected people's personal status and awareness about HIV/AIDS. For this reason it is hypothesised that social stigma prevails in the community of the rural and urban areas of Palakkad.

The 5th component explains (8.93%) the total variance with 13 variable factors. Of the total number of the 7 positive variable expressed as PLHA presently using MLHA collect sexual knowledge from Books0.91 MLHA out of station <7,0.84 FLHA suffering fever0.73, FLHA 20-30 age group0.67, MLHA have sexbefore marriage0.64 MLHA are engaged as Unskilled truck auto drivers0.63 MLHA engaged first sex work 15--25 age group0.43.

The negatively loaded 3 variables are MLHA suffered HIV/AIDS in 1--3 year-0.90 MLHA not interest in life-0.73 ,MLHA bothered about family-0.62, FLHA 30-39 age group-0.56 ,MLHA reveal test to partner-0.43, MLHA believes HIV/AIDS is Infectious disease-0.41

As this component explain the multidimensional determinant factors of People Living with HIV/AIDS and the sexual knowledge here this dimension is named as Dimension of Variation of sexual knowledge and practice among the PLHA. Consequently it is hypothesised that lack of education resulting the false impression of HIV/AIDS and sexual knowledge in the common people.

The 6th component account for only 7.61 % of the total variance and loaded with 11 variables in the dimension of sexually transmitted disease and rural population. The dimension of FLHA believes Access is difficult to treatment0.81, Family

Welfare Centre/000 population0.77, FLHA suffered HIV/AIDS0.68, FLHA got Moral support0.68 ,No. of Welfare Centre0.62, FLHA Sexual contact0.50, MLHA have 4--6 family members0.45 are positively loaded. While the negative variable considered as FLHA lived 2--4 years-0.80, FLHA <2000 rupees-0.67, MLHA Partner prevents condom use-0.60, FLHA transferred HIV trough Mother to Child-0.50.

All the positive loading variables cluster around accessibility of treatment than the negatively loaded variables. Hence this component explains the Dimension of treatment difficulty and the role of Govt welfare centres and NGO in the prevention activities.

The 7th component explains (7.51%) of total variance together with 11 variables ranging from (0.43 to0.91) The variable such as FLHA got sex knowledge from friends0.91, MLHA bothered about family0.56 ,MLHA in the age group (30-39)0.54 ,No of Beds0.52, FLHA believes the HIV/AIDS are Infectious0.52, FLHA in the age group 30-39 (0.49).

Whereas the negative factors FLHA got sex knowledge from Books -0.91, MLHA in the age group of (20-30)-0.77,Use of unsterilized syring e-0.46, Family Welfare Centre/000 population-0.45, FLHA in the age group of 20-30-0.43

These factors simply associated with the living condition of PLHA, botheration about family and the comprehensive knowledge about HIV/AIDS so that it is aptly called as the Dimension of sexual knowledge and personal status of PLHA.

The 8th components explains (7.44%) of the total variance with loading of 0.44 to 0.90 in both direction. This positively loaded variables are the FLHA belongs to Muslim community0.90, FLHA isolated from the society0.58, MLHA believes HIV is a Infectious0.45 ,MLHA suffered TB0.45, MLHA Sexual contact0.42, MLHA got sex knowledge from Friends0.42

The negatively loaded factors are business FLHA Hindu community-0.92, FLHA bothered family-0.74, MLHA have first sex in the age group of 15--25-0.62, MLHA High school level education-0.51, FLHA Frustrated due to HIV/AIDS-0.44. These 11 factors strongly associated with the HIV/AIDS infected population, their level of literacy, awareness, disease so that it is aptly named as the FLHA isolation from the society and the role of NGO.

The 9th component explains (6.70%) of the variations in the data matrix with a 11factor loading in both direction (0.41 to 0.80). The positive variables such as FLHA Frustrated due to the HIV infection 0.80, MLHA isolated from society 0.71, MLHA under ART 0.67, MLHA are Unemployed0.58, MLHA engaged as Unskilled truck auto drivers0.54, MLHA Higher secondary level of education0.50, MLHA Married0.49 ,FLHA suffered TB 0.42, No. of Welfare Centre0.41.

The remaining 3 negatively loaded factors are FLHA Not interest in life-0.78, FLHA 1--3 year-0.55, FLHA reveal the test result to the partner -0.41. On the basis of cluster and association it is treated as the Dimension of MLHA isolated from the society and treatment seeking behaviour.

The 10th component explains (6.49%) of the variations in the data matrix with an 11factor loading in both direction (0.41 to 0.89). The positive variables such as FLHA Married0.89, FLHA reveal test result to partner0.65 MLHA Christian community, 0.56 FLHA getting nutritious food0.44; FLHA believed HIV/AIDS is an Infectious disease0.42.The remaining 6 negatively loaded factors are FLHA lived as Single-0.89, FLHA out of station <7 days-0.57, MLHA suffered fever -0.49, MLHA belongs to Hindu community -0.48, MLHA have 4—6 family members -0.48, MLHA getting nutritious food-0.41. On the basis of the cluster and association it is treated as the Dimension of the religious background, marital status and diagnosis of HIV/AIDS test result to the partner.

The input data of 72 variables both primary and secondary information of People Living with HIV/AIDS in Palakkad district is summarised into ten factors. The factor loading explains with ten dimensions of the People living with HIV /AIDS in Palakkad and their associated problems. But in the spatial context it shows variation in the magnitude of the problem.

The Spatial Imbalance in the Multidimensional Character of People Living with HIV/AIDS and the Integrated Approach for the Public Health Planning:

The component scores derived for each observation areal unit of the Palakkad districts in the Kerala State shows the spatial variation in the respective factor score. The positive and negative scores pertaining to each component shows the problems related to People Living with HIV/AIDS in the blocks of Palakkad district. The score value above1 in positive side denotes high problems related to HIV/AIDS. Whereas the value of 0 to 1 denotes medium level problems of HIV/ AIDS. The negative value of -1 to 0 indicates low range of problems HIV/AIDS and index score below- 1 denotes very low prevalence of problems in HIV/AIDS in the spatial context.

Spatial Pattern of Multidimensional factors with People Living with HIV/AIDS

In the present analysis all the components are selected based on the dimension related to People Living with HIV/AIDS in Palakkad district. In these 10 dimension are validly hierarchical order factor loading are arranged on the basis called Dimension of Personal status of the Living condition of HIV/AIDS infected persons Sexual Knowledge, Awareness and role of Govt &NGO, Dimension of

population character with HIV/AIDS infected Persons, health care accessibility and problem . Accessibility and Availability of HIV/AIDS Treatment and Stigma in the Society. Dimension HIV/AIDS infected persons in the rural areas with Health care Facility and Sexually Transmitted Disease. The illustration developed on the basis of GIS portray visual imbalance in the pertain to particular dimension. From this the individual dimension related problem area is identified for the Public Health Planning.

Table 1.3

Palakkad: Block wise distribution of the Ten Factors and their Composite Index values

Blocks	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI	Factor VII	Factor VIII	FactorIX	Factor X	Composite index
Alathur	-1.96	0.19	2.26	0.29	0.51	-0.50	-0.18	0.60	0.20	-0.33	1.08
Attapadi	0.60	-1.38	0.05	2.11	0.06	1.51	-0.53	-0.21	0.07	0.41	2.69
Chittur	0.05	0.32	-0.40	1.58	-0.35	-2.01	0.85	-0.59	-1.64	-0.28	-2.48
Kollamgode	0.07	1.27	-0.17	-0.36	1.45	0.26	-2.25	-0.56	-0.82	0.41	-0.71
Kuzhalmannam	0.22	-0.70	-0.04	0.20	0.06	0.36	-0.21	-0.89	0.10	-0.28	-1.19
Malampuzha	0.87	-1.24	1.31	-1.22	0.51	0.59	1.08	0.33	-0.92	-0.49	0.83
Mannarkkad	-1.72	0.03	-1.16	-0.48	-0.29	0.93	1.03	0.40	-0.63	1.98	0.08
Nenmara	-0.08	-1.66	-1.18	-0.55	0.09	-1.54	-1.10	1.55	0.78	-0.08	-3.09
Ottapalam	0.64	0.04	-0.33	-1.57	-0.50	-0.06	-0.01	-0.78	-1.04	-0.38	-3.99
Palakkad	0.69	0.37	1.06	-0.36	-1.85	-0.63	-0.36	-0.92	1.36	1.44	0.81
Pattambi	0.86	0.84	-0.41	0.10	2.00	-0.39	1.50	-0.16	1.63	0.36	6.33
Sreekrishnapuram	0.96	1.63	-0.07	0.41	-1.02	0.77	0.03	2.24	-0.16	-0.64	4.15
Thrithala	-1.20	0.28	-0.92	-0.15	-0.66	0.71	0.16	-1.01	1.06	-2.11	-3.85

Spatial Disparity in the Dimension of Personal Status of the Living condition of HIV/AIDS Infected Persons Sexual Knowledge, Awareness and role of Govt & NGO

In this category Personal status of the Living condition of HIV/AIDS infected persons Sexual Knowledge, Awareness and role of Govt &NGO dimension represent the various natures of the infected people in Palakkad district,

Factor I **Dimension of Variation of the PLHA and their awareness and Sexual practice, Preventive tools and Psychological Problems**

Table1.3 shows High factor score represented in Sreekrishnapuram 0.96 , Malampuzha 0.87 Pattambi 0.86 , Palakkad 0.69 , Ottapalam 0.64 , Attapadi 0.60 , Kuzhalmannam 0.22 , Kollamgode 0.07 , Chittur 0.05 next with medium positive factor score(Zero to+1) in this dimension. Low negative score identified from Nenmara blocks-0.08 ranks third order with low negative score (less than 1). The blocks of Thrithala -1.20, Mannarkkad -1.72, Alathur -1.96 register high negative factor score.

Factor II **Dimension of Health care facility and Availability of HIV/AIDS treatment**

The Table 1.3 demonstrates the Dimension of Health care facility and Availability of HIV/AIDS treatment highlight Sreekrishnapuram1.63 Kollamgode 1.27 in Palakkad district have very high positive score value. Table-1.3. In seven blocks has low positive score (0 to +1) i.e. Pattambi0.84 Palakkad0.37 Chittur0.32, Thrithala0.28, Alathur0.19 ,Ottapalam0.04 and Mannarkkad0.03.Low negative score observed (0- -1) only in Kuzhalmannam block -0.70 .While high negative (>-1) factor score represented in Malampuzha -1.24, Attapadi-1.38 and Nenmara-1.66.

Factor III **Dimension of Availability and accessibility of ART treatment and role of NGO and Govt.**

Dimension of Availability and accessibility of ART treatment and role of NGO and Govt draw attention to Alathur 2.26, Malampuzha 1.31 and Palakkad1.06 blocks in Palakkad district have very high positive score value. Table 1.3 low positive (0 to +1) score represented only in Attapadi block 0.05. Low negative score observed only in seven blocks (0- -1) Kuzhalmannam-0.04, Sreekrishnapuram-0.07, Kollamgode-0.17 Ottapalam-0.33,Chittur-0.40, Pattambi-0.41,Thrithala-0.92 .While high negative (>-1) score represented in two blocks Mannarkkad-1.16 and Nenmara-1.18.

Factor IV **Dimension of Psychological problems of the PLHA, personal status and awareness about HIV/AIDS**

Dimension of Psychological problems of the PLHA, personal status and awareness about HIV/AIDS bring to light Attapadi 2.11 and Chittur1.58 blocks in Palakkad have very high positive score value. Table 1.3 In four blocks has low positive (0 to +1) i.e. Sreekrishnapuram 0.41, Alathur0.29 , Kuzhalmannam0.20 and Pattambi0.10. Low negative score observed in (0- -1) represented in Thrithala-0.15,

Palakkad-0.36 ,Kollamgode-0.36, Mannarkkad-0.48 and Nenmara-0.55.While high negative (>-1) score represented in Malampuzha-1.22 and Ottapalam-1.57.

Factor V Dimension of Variation of sexual knowledge and pactice among the PLHA.

Dimension of Variation of sexual knowledge and practice among the PLHA highlight Pattambi2.00 and Kollamgode1.45 blocks in Palakkad district having very high positive score value. Table 1.2. In five blocks has low positive (0 to +1) i.e. Malampuzha 0.51, Alathur0.51, Nenmara0.09, Attapadi 0.06 and Kuzhalmannam 0.06 . Low negative score observed in (0- -1) in the blocks of Mannarkkad-0.29 and Chittur-0.35 Ottapalam-0.50 and Thrithala-0.66. While high negative (>-1) represented in Sreekrishnapuram-1.02 and Palakkad-1.85.

Factor VI Dimension of treatment difficulty and the role of Govt welfare centers and NGO in the prevention activities.

Dimension of treatment difficulty and the role of Govt welfare centres and NGO in the prevention activities highlight Attapadi blocks 1.51 in Palakkad having very high positive score value .Table 1.3 In six blocks has low positive (0 to +1) i.e. Mannarkkad0.93 ,Sreekrishnapuram0.77, Thrithala0.71, Malampuzha0.59 ,Kuzhalmannam0.36 ,Kollamgode0.26. Low negative score observed in (0- -1) Ottapalam-0.06 ,Pattambi-0.39, Alathur-0.50 and Palakkad-0.63. While high negative score represented (>-1) in Nenmara-1.54 and Chittur-2.01 .

VII Dimension of sexual knowledge and personal status of PLHA.

The Table 1.3 lay emphasis on the Dimension of sexual knowledge and personal status of PLHA. Pattambi1.50, Malampuzha1.08 and Mannarkkad1.03 in Palakkad having very high positive score value. In three district has low positive (0 to +1) i.e. Chittur0.85, Thrithala0.16 and Sreekrishnapuram0.03. Low negative score observed in five blocks i.e. (0- -1) Ottapalam-0.01, Alathur-0.18, Kuzhalmannam-0.21 ,Palakkad-0.36, Attapadi-0.53.While high negative (>-1) score represented in Nenmara-1.10 and Kollamgode-2.25.

VIII Dimension FLHA isolation from the society and the role of NGO .

It is seen from the table 1.1 Dimension of FLHA isolation from the society and the role of NGO lay emphasis on Sreekrishnapuram2.24 and Nenmara1.55 in Palakkad district having very high positive score value. Table 1.3 and figure 1.2. In three district has low positive (0 to +1) i.e. Alathur0.60, Mannarkkad0.40 and Malampuzha0.33. Low negative score observed in seven blocks (0- -1) Pattambi-0.16, Attapadi-0.21, Kollamgode-0.56, Chittur-0.59, Ottapalam-0.78, Kuzhalmannam-0.89 and Palakkad-0.92. While high negative score (>-1) represented in Thrithala-1.01.

IX Dimension of MLHA isolated from the society and treatment seeking behaviour

It is make obvious from the table 1.3 the Dimension of MLHA isolated from the society and treatment seeking behaviour very high positive score value in the blocks of Pattambi1.63, Palakkad1.36 and Thrithala1.06 in Palakkad district .Table 6.13 and figure 6.3. In four district has low positive (0 to +1) i.e. Nenmara0.78, Alathur0.20 Kuzhalmannam0.10 and Attapadi0.07. Low negative score observed in (0- -1) Sreekrishnapuram-0.16, Mannarkkad-0.63, Kollamgode-0.82 and Malampuzha-0.92.While high negative (>-1) score represented in Ottapalam-1.04 and Chittur-1.64.

Factor X Dimension of the religious background, marital status and diagnosis of HIV/AIDS test result to the partner.

Table 1.3 shed light on the Dimension of the religious background, marital status and diagnosis of HIV/AIDS test result to the partner .Mannarkkad1.98 and Palakkad1.44. having very high positive score value . In three blocks has low positive (0 to +1) i.e. Kollamgode0.41 ,Attapadi0.41 and Pattambi0.36 .Low negative score observed in (0--1). Nenmara-0.08 ,Chittur-0.28 ,Kuzhalmannam-0.28, Alathur-0.33 ,Ottapalam-0.38 Malampuzha-0.49 and Sreekrishnapuram-0.64. While high negative score (>-1) represented in Thrithala-2.11.

Composite index:

Spatial Pattern of People Living with HIV/AIDS Disparities in the associated problems.

Ten factors are explained separately on the basis of the virtual significance to their score values obtained for People living with HIV/AIDS and associated problems. However, it will not give an entire image about the spatial pattern of complexity of the problems in the study area. Hence, the overall people living with HIV/AIDS factor is explained through the ten factors taken in to consideration to consolidate the people living with HIV/AIDS thirteen blocks in Palakkad district.

The composite score thus obtained has been illustrated through a Geographic Information System based map to visualize the spatial variation of problem of People living with HIV/AIDS and to integrate the factors associated with regional variation in order to highlight macro level planning proposal. Table 1.3 and figure 1.2 illustrate the spatial variation in People Living with HIV/AIDS. Accordingly similar blocks are noted within the total 13 blocks in Palakkad district, 3 block represent very high composite index(> +2) 4 blocks with high index+2 to 0, 2 blocks with low index value 0 to - 2 and 4 blocks with very low index value below -2 .

A GIS Approach to public health planning for the People Living with HIV/ AIDS:

The spatial variation people living with HIV/AIDS and health care facility is in complex nature to the pattern of multidimensional character and identify the specific strategy for planning health services. Hence a composite multi score is computed and GIS Maps is being used to explore the problem area identification.

Spatial disparity of Health related problems faced by the PLHA in Palakkad district.

Blocks with Very High HIV/AIDS related problems composite index value (+>2) registered in Pattambi 6.33 ,Sreekrishnapuram 4.15 and Attapadi block 2.69 score value. High HIV /AIDS related problems 4 blocks in Palakkad district be a sign of medium index+2 to 0 of HIV/AIDS related problems ie Alathur1.08, Malampuzha0.83, Palakkad0.81 and Mannarkkad 0.08.

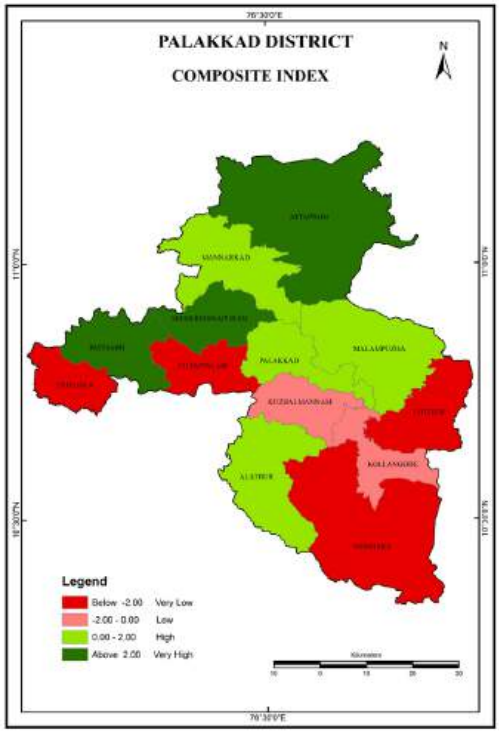

Figure 1.2

Blocks with low HIV/AIDS related problems Only 2 blocks in Palakkad districts stand for low index value 0 to – 2 ie Kollamgode-0.71 and Kuzhalmannam-1.19. Blocks with very low HIV/AIDS related problems Only 4 blocks in Palakkad district with very low index value -2 to - 4 . It is represented in the blocks of Chittur-2.48, Nenmara-3.09 ,Thrithala-3.85 and Ottapalam-3.99.

CONCLUSION

The availability of micro level health data related to the people living with HIV/AIDS, the expansion of software solutions, advancement in computer capabilities, and a growing interest in health disparities have promoted the rising profile of health mapping. Spatial distribution people living with HIV/AIDS and their relationship between social ,cultural, psychological and health condition are considered for the present analysis and identified the problematic region in the block level i.e. Pattambi , Sreekrishnapuram and Attapadi block moderate of HIV/AIDS related problems identified from Alathur,Malampuzha, Palakkad and Mannarkkad.Blocks with low HIV/AIDS related problems i.e. Kollamgode and Kuzhalmannam. Blocks with very low HIV/AIDS related problems are represented in the blocks of Chittur, Nenmara-, Thrithala, and Ottapalam- this will be ready to lend a hand for a sustainable planning to the future.

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