

Original Article

A cross sectional study of Screening for hypertension, diabetes and connectivity in the rural population of North Karnataka, India

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ABSTRACT:

Objective: To study the prevalence of raised blood pressure and / or raised blood sugar among persons above the age of 30 years in the rural population served by peripheral health post (sub center). It was also intended to find how many people have Mobile phone for future M-health project. **Methodology:** Systematic samples of 850 persons were selected and included in the study. General health, blood pressure and blood sugar, checkup was done. Of the 850 persons approached, 746 participated in the study giving a response rate 88 %. Their participation was voluntary, informed, consented, anonymous and confidential. The demographic details, anthropometric measurements, clinical findings were recorded, compiled and analyzed using SPSS statistical software 21.0 Version. **Results:** Out of the 736 respondents, 255 (34.18%) are male and 491 (65.82%) are female. 18.43% of the male and 29.94% female are overweight. 92.42% have normal blood pressure (120/80mm of Hg), while 6.56% have raised blood pressure (>140/90 mm of Hg) in the age group 30-39 years. Correspondingly, in the elder age (70 years and above), 52.70% have normal blood pressure (120/80mm of Hg) while 40.0 % have raised blood pressure (>140/90 mm of Hg). This is a significant finding with $p < 0.05$. However, 93.37% have normal blood sugar (<140mg %), while 6.63% have raised blood sugar (>200mg%) in the age group 30-39 years. Correspondingly in the age group 70 years and above, 78.29% have normal sugar level (<140mg%) while 21.7% have raised blood sugar (>200mg%). This is a statistically significant finding with $p < 0.05$. **Mobile Connectivity:** There is good telecommunication network in the community and 76% participants have Mobile phone. Ninety one percent of them are familiar with operating mobile phones and are able to answer the phone call. **Conclusion:** The raised blood pressure levels are a frequent finding with 167 persons (22.38%), while the 49 (6.57%) persons showed raised blood sugar. These findings are found statistically significant with $p < 0.05$. The telecom network is good and 76% participants have Mobile phone. The community supported our efforts by their participation. **Key Words:** Hypertension, Diabetes, Delay in presentation, Screening.

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INTRODUCTION: The Sub health centre is the frontline distant unit of the health care system. It is looked after by "Health Workers". The centre has a population of 5000 persons or roughly 1000 families. But as the centre grows older the population is likely to increase. However no extra health care personnel are recruited. The strategy is Primary Health Care with focus on Maternity, Child Health and control of Communicable diseases. This strategy has been hugely successful, communicable diseases are under control, mothers seek early antenatal care, deliveries are

institutionalized and impressive childhood immunization coverage. The disease transition has brought in Hypertension, Diabetes, Cancer⁽³⁾, Substance abuse, Low backache in the population. Consequently Stroke, Ischaemic Heart Attacks, Chronic pain, Addiction have been of common occurrence. This disease transition is seen in all regions of the world⁽⁵⁾.

The health care centre or its functionaries are not equipped to manage these diseases. The sufferers have to reach the nearer urban centres or private doctors for treatment and

invariably there is certain delay in the presentation and consequently the suffering and death.^(7,11) Hence the need for screening ⁽⁶⁾ of the people for early diagnosis of these diseases. The present study is one such attempt.

MATERIALS AND METHODS:

The study was conducted with institutional approval and systematic random samples of 850 persons aged 30 years and above. Before, start of the study, we met the village leaders and created awareness about health check; conducted a health camps at several convenient places nearby to their houses, then obtained individual informed consent from the participants. Only 746 persons attended the checkup with the response rate 88%. The data on demographic details, height, weight, systolic blood pressure, diastolic blood pressure; random blood sugar and treatment details if any recorded during the health camp. The team members are trained, adhere to standard guidelines and conduct the program as per the protocol. Further, inter and intra examiner reliability was performed on convenient of 50 patients. The inter examiner reliability coefficient was found to be 0.9874 and intra examiner reliability coefficient was found to be 0.9797 on blood pressure. The blood pressure was recorded using Mercury Sphygmomanometer and Random Blood Sugar using Glucometer. The whole procedure takes 40 minutes for each participant. The individual findings were kept confidential, anonymous while compiled data is shared.

STATISTICAL ANALYSIS: The data were analyzed using statistical software SPSS 21.0 version. The results are presented in mean, standard deviation and percentages. Difference between groups is assessed using chi square test. The statistical significance was set at 5% level of significance (p<0.05).

RESULTS:

Out of a sample of 850 persons, only 746 responded to attend the free health check clinic and the response rate is 88%. Out of the responders 255 (34.18%) are male and 491 (65.82%) are female. The participants are aged 30 or above years, the average age 53.7 SD 14.78. In

their nutrition status (18.43%) of male and (29.94%) female are above normal weight. For the Physical activity (35.69%) of male and (45.42%) of female are moderately active. The male participants (45.10%) consume tobacco and only (15.07%) female are used for tobacco. Again males (17.25%) consume alcohol drinks while negligible (0.20%) female consume alcohol drinks. In the age group 30-39 years (92.42%) have normal blood pressure while 6.56% have raised blood pressure. Correspondingly in the elder age 70 years and above 52.70% have normal blood pressure while 40.% have raised blood pressure. This is a significant finding with p<0.05

Blood sugar: In the age group 30-39 years 93.37% have normal blood sugar, while 6.63% have raised blood sugar. Correspondingly in the age group 70 years and above 78.29% have normal sugar level while 21.7% have raised blood sugar. There is good telecommunication network in the community and 76% participants have Mobile phone, 91% of the time they are able to answer the phone call.

Table 1: Distribution of study participants by sex and age groups

Factors	No of patients	%of patients
Sex		
Male	255	34.18
Female	491	65.82
Age groups		
30-39	166	22.25
40-49	140	18.77
50-59	101	13.54
60-59	210	28.15
70+	129	17.29
Mean age	53.47	
SD age	14.78	
Total	746	100.00

Table 2 Study participant’s Status of ≥BMI by sex

Obesity	Male	%	Female	%	Total	%
Under weight	58	22.75	84	17.11	142	19.03
Normal	150	58.82	260	52.95	410	54.96
Over weight	47	18.43	147	29.94	194	26.01
Total	255	100.00	491	100.00	746	100.00
Chi-square= 12.4011 P = 0.0022*						

*p<0.05

Table 3: Comparison of male and female participants with different characteristics

Characteristics	Male	%	Female	%	Total	%	Chi-square	p-value
Physical Activity								
Normal	134	52.55	230	46.84	364	48.79	7.8794	0.0195*
Moderate	91	35.69	223	45.42	314	42.09		
No	30	11.76	38	7.74	68	9.12		
Tobacco use								
Yes	115	45.10	74	15.07	189	25.34	79.9945	0.0001*
No	140	54.90	417	84.93	557	74.66		
Alcohol use								
Yes	44	17.25	1	0.20	45	6.03	86.0878	0.0001*
No	211	82.75	490	99.80	701	93.97		

Table 4. The study participant’s status of Blood Pressure

Age/BP	BP≤120/80	BP>120,<140	BP≥140/90 Range140-158	BP≥160/100 Range160-178	BP≥180/110 Range 180-198	BP≥200/120
30-39 Years	183 (92.42%)	02 (1.01%)	008 (4.04%)	003 (1.52%)	000(0.00%)	002 (1.01%)
40-49 Years	108 (78.83%)	03 (2.1%)	018 (13.14%)	006 (4.38%)	002(1.46%)	000 (0.00%)
50— 59Years	103 (69.13%)	05 (3.36%)	024 (16.11%)	013 (8.72%)	002 (1.34%)	002 (1.34%)
60-69 Years	122 (64.21%)	11 (5.79%)	036 (18.95%)	015 (7.89%)	003 (1.58%)	003 (1.58%)
70 Years and +	039 (52.70%)	04 (5.79%)	017 (22.97%)	008 (10.81%)	005 (6.76%)	001 (1.35%)

Chi-square=78.1796, p=0.0001*

Table 5. The study participant’s status of Blood Sugar (random)

Blood sugar	Male	%	Female	%	Total	%
≥200	16	6.27	33	6.72	49	6.57
≥140-<200	36	14.12	63	12.83	99	13.27
Below 140	203	79.61	395	80.45	598	80.16
Total	255	100.00	491	100.00	746	100.00
Chi-square= 0.2712 P = 0.8712						

Table 6 : The study participant’s status of Blood Sugar (random) in age groups

Age	≥200	%	≥140-<200	%	Below 140	%	Total
30-39	2	1.20	9	5.42	155	93.37	166
40-49	7	5.00	17	12.14	116	82.86	140
50-59	10	9.90	16	15.84	75	74.26	101
60-69	20	9.52	39	18.57	151	71.90	210
70+	10	7.75	18	13.95	101	78.29	129

Figure 1.

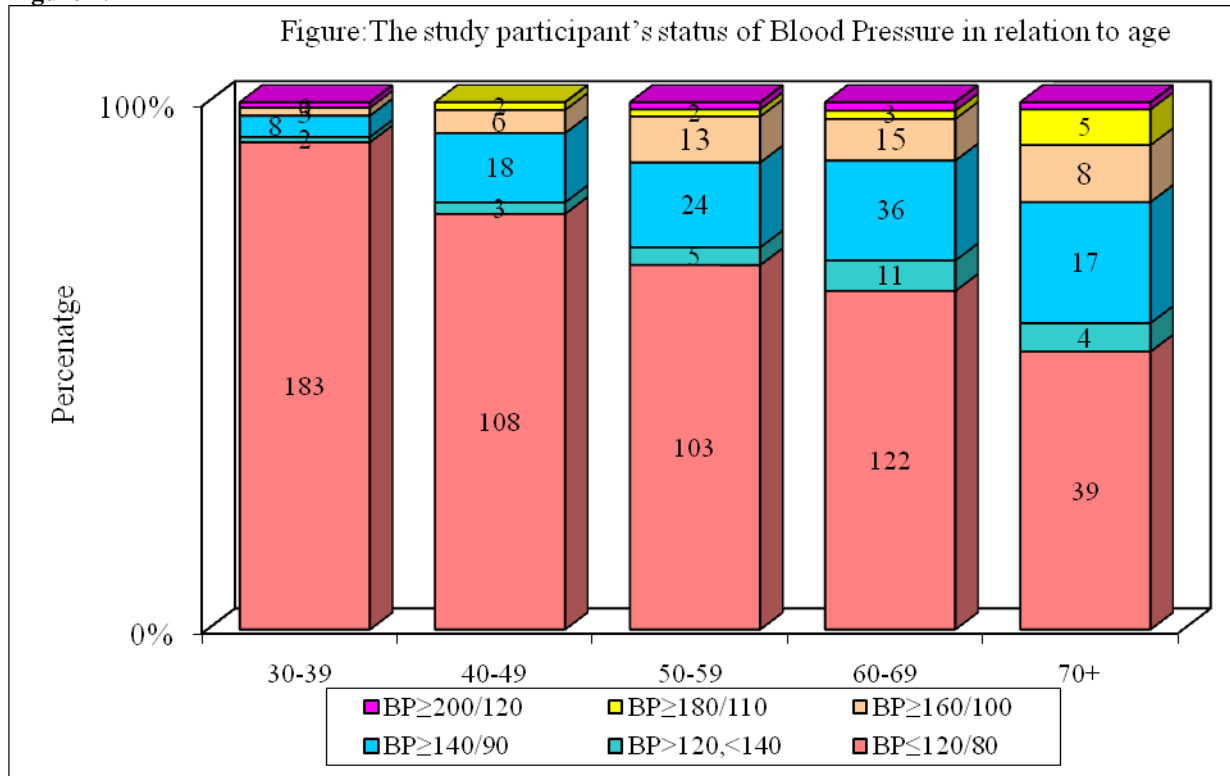
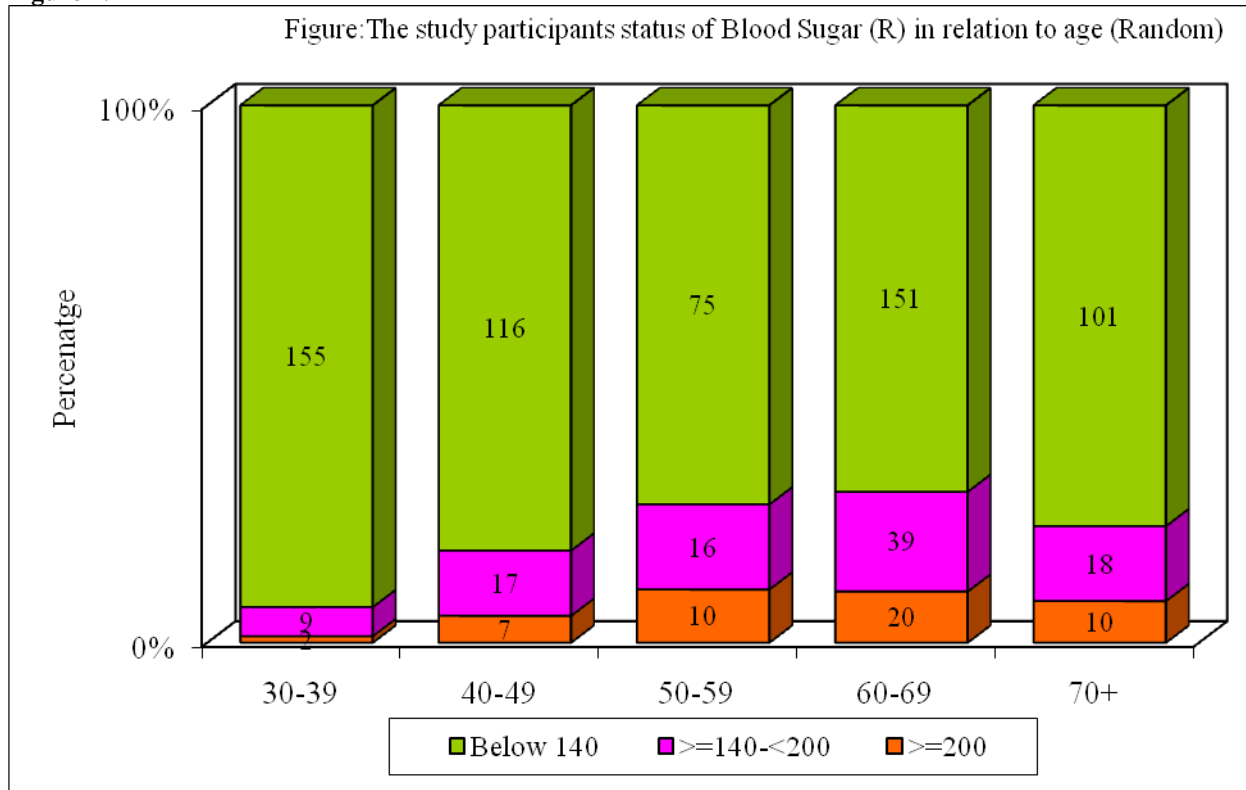


Figure 2.



DISCUSSION: In countries that have adopted Primary Health Care strategy, the “Sub Centre” occupies a unique position. It is the most distant, peripheral health out post, catering to the needs of 1,000 to 1,200 families or a population of 6 to 7 thousand and has an average of 2,400 adults aged above 30 years. It is run by an Axillary nurse cum midwife and a male health worker. These personnel know each and every family; their focus is on maternity, child care and family planning besides control of communicable diseases like Dengue fever, Malaria. They are doing admirable work over the years. However they are resource scarce, untrained, less equipped and unassisted to handle the present day challenges like hypertension, diabetes, Substance abuse, Mental depression, Low Back ache, Thyroid related disorders and cancer. Somehow it has not occurred to our health system planners to find ways and means to support these frontline workers, nor has any help come from neighboring private health care agencies.

The literature is full of studies concerning prevalence of Hypertension and Diabetes; however this study is set in the context of a most peripheral unit of the health care system. The Indian population studies reported a prevalence of 1.2-4% during 1950's, 5% in 1960's, 7% in 1970's, 12-15% in 1990's, 23% in 2005's and 33% in 2016 for Hypertension in adults aged >30 years. Hypertension is the most commonly diagnosed condition at outpatient office visits and High blood pressure is a major contributing risk factor to heart failure, heart attack, stroke, and chronic kidney disease. It is the primary or contributing cause of suffering or death for people. The evidence on the benefits of screening for high blood pressure is well known. There are no harms in screening for hypertension.

The prevalence of type 2 diabetes in India during 1970's was 2.1 per cent, in 1980's 5 per cent and in 2000's reached 6.1percent and in 2005 an average prevalence of 11% by 2015⁽¹⁰⁾. We have 63 million people suffering from Diabetes and we top the list in the world besides China and USA. The morbidity and mortality associated with diabetes are enormous and the impact of the treatment cost is huge on the economy. The benefits of screening/diagnosis in the early stage are substantial^(1,4,8). The diabetes and hypertension often go together and are twin dangers to humanity.

To screen, identify for Hypertension and Diabetes is fairly simple process^(2,9). The rural areas lack the facilities to detect, diagnose diabetes in early stage. Hence screening for hypertension and diabetes are necessary along with campaign for Life style changes.

The response rate of 88% is quite good in our study. Since we conducted the Mobile camp between 9 am to 1.00 pm more women participants came forward than men. The first few minutes spent to collect demographic details, Mobile phone number, check for height and weight help in refreshing the mindset of persons and establish good rapport. The participants are spread in different age group with a mean age 53.47 and SD 14.78. The BMI Score shows

18.43% male and 29.94% female are overweight, may be this is contributing factor for hypertension/diabetes. Then 43% male, 53% female are exposed to moderate or minimal physical activity indicating the present trend of sedentary life style. The male participants (45.10%) consume tobacco and only (15.07%) female are used for tobacco. Again males (17.25%) consume alcohol drinks while negligible (0.20%) female consume alcohol drinks.

Among the participants 5.8% males and 8.3% females are known patients of diabetes, taking treatment. Similarly 13.3 % male and 15.7 % female are known to suffer from Hypertension, are taking treatment. We take Blood Sugar level and Sex variables together and find 6.27% males, 6.72% females have ≥ 200 mg, 14.12% male and 12.83% female have blood sugar level between 140 and 200 mg. Summing up 20.39% male and 19.15% female need some extra attention. 39.22% male and 32% females have systolic hypertension, 40% males and 25% female have diastolic hypertension. We find that the blood pressure and Blood sugar levels are related to the age, older the individual more chance for raised blood pressure/Blood Sugar. In the age group 30-39 (92.42%) have normal blood pressure 6.5% have raised blood pressure while in the age group 70+ (52.70%) have normal blood pressure and 43.0% have raised blood pressure. Similarly for blood sugar in the age group 30-39 93.0% have normal levels, have 1.20% raised levels, while in the age group 70+ 78.7% have normal levels, 7.75% have raised levels. These findings are statistically significant with $p < 0.05$

Based on this study on an average we are likely to expect 490 persons to have raised blood pressure and 150 persons to have raised blood sugar in a Sub health center population.

At the same time literacy level of people have gone up, plenty of food is available in the market, there is rise in the income of people, amazing innovations in communication technology. The Mobile Phone is a most versatile, easy to use, affordable instrument available with most families (76%). In a span of few years Smart phone sets, internet connectivity too have reached these families and we have ideas to harness this mobile technology to engage these families for health care interventions.

LIMITATIONS: We are fully aware of our short comings. These days Hb A1 c, Glucose Tolerance Test, are used for screening Diabetes disease. In view of scarce resource, time involved and feasibility, we have used random blood sugar. However this has not vitiated our efforts and results are comparable with other studies.

CONCLUSION: The community supported our efforts by their participation. The raised blood pressure levels are a frequent finding with 167 persons (22.38%), while the 49 (6.57%) persons showed raised blood sugar. These findings

are found statistically significant with $p < 0.05$. The telecom network is good and 76% participants have Mobile phone.

DISCLAIMER:

The authors have their individual significant, contribution in the article, have no conflicts, no competition or contradictory interests. Dr. Mohan. Sunkad initiated the study, Mr.Sulikeri organized, conducted the activities and collected data, Dr.Javali. did the sampling, compilation, Statistical analysis. Dr. Awate responsible for the study design, co-ordination and team connection,. All the authors read and approved the final manuscript. 9685986415

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