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Establishment of State Epidemic Intelligence Unit: From Thought to Action

J. K. Kosambiya

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Epidemic Intelligence Unit (EIU): the birth of a thought

Public Health Emergencies of International Concern (PHEIC) have always been a threat to the health care system regardless of level (country, state or district).^[1,2] The year 2020 will always be remembered for one of the biggest pandemics in the history of mankind. Gujarat, like other states of India, was challenged by the COVID-19 pandemic. In the Department of Community Medicine, Government Medical College, Surat, Gujarat, we were forecasting the course of COVID-19 wave in Surat city and Surat District using modeling techniques. It was during this activity that we became acutely aware that there was an unmet need of big data collection and analysis, especially at State level. It was as if we knew the recipe but had no ingredients. The data demand was high, but there was no initiative in systematic data collection and management. As Community Medicine personnel, we were concerned about the quality of data and real time availability. We envisaged regular data flow that could help us derive trends, link cases and project to future. The State Ministry of Health and Family Welfare identified PSM departments of the medical colleges of the State to establish an Epidemic Intelligence Unit (EIU) and invited us to take the lead. As the Nodal Officer of EIU, we were able to prepare a roadmap of our vision. The Epidemic Intelligence Unit was seen as a frontline unit for rapid risk assessment and response to COVID (or any other acute PHEICs).^[3] The expected

outcomes of setting up EIU, during COVID-19 pandemic were:

- 1. Giving a lead time, through early warning system before exponential growth of cases/ outbreak.
- 2. Detection of changes in clinical presentation
- 3. Detection of changes in vulnerability of people and identifying at risk population.
- 4. Estimating impact of outbreak
- 5. Detection of changes in infection transmission dynamics.
- 6. Expanding Epidemic Intelligence to other infectious diseases.

Right from the beginning, it was evident that data collection and analysis of this magnitude will not be a simple task. Hence we decided to list down our prerequisites.

EIU: Gathering the tools

We proposed a three-tier system, composed of State, Regional and District Epidemic Intelligence Unit. Each level integrated the existing reporting systems with the Departments of Community Medicine in medical colleges across the state.

An Early Warning System needed collection of meaningful indicators, such as Case line list, contact tracing and testing data from each district. Hospital and community level data had to be collected. Apart from demographic details, we also focused on

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symptomatology, gaps in symptom onset, detection, and link to care. Of particular interest was COVID-19 infection among children, travelers, and vaccinated population. We established a Google sheet-based database, where the reporting Districts/ Corporations could share the data on a weekly basis. This data, was cleaned, analyzed, and interpreted at the Department of Community Medicine Government Medical College Surat. Data flow in EIU is given in Figure -1.

EIU: The impact

The systematic data collection, analysis and interpretation through EIU helped in identifying emerging hot spots, contain the spread of infection by timely forming containment zones and inform active and passive surveillance activities.^[4,5]

Every week, we were able to comment on the sociodemographic profile, clinical presentation, change in trends, vulnerability of sub groups and gaps in detection and care. Thus, the EIU could make several important observations from time to time, such as stabilization of second wave, beginning of third wave and track high inflow of COVID-19 cases from neighboring states. We were able to identify districts at risk and suggest feasible, appropriate and optimal control measures. We were able to identify missed case links and highlight insufficient contact tracing in some districts.

EIU: The challenges and future

The scope of EIU can be expanded even further, to allow us to comment on short and long term impact of COVID-19. In order to detect changes in clinical presentation and changes in risk factors or vulnerability of people, uniform case reporting and data collection is mandatory. Major challenges of EIU were:

Incomplete and non uniform patient hospital records: It was observed that data was missing in hospital records, which in turn resulted in difficulties in data collection and incomplete information. We propose that an Uniform case reporting format for notifiable infectious diseases, designed by EIU and approved by Ministry of Health and Family Welfare, Government of Gujarat (MoHFW, GoG), must be used by medical practitioners across the state. Existing system of case paper/ case record must be replaced by Uniform Case reporting format, to minimize duplication of work and ensure uniformity and completeness of patient record.



Figure 1 : Data Flow in EIU

Additionally, Uniform reference ID system for lab investigations and radiology report should be generated. Family/ Contact ID must be generated when families or contacts are tested. This alpha numeric ID with QR code must be traceable to the date, lab/ radiologist and batch of test process and linked to Uniform Case reporting format.

• Data entry and cleaning: We observed that despite the efforts at all levels, errors could creep in to the reported data. This required repeated rounds of data cleaning and supportive supervision. Given the utility and ability of EIU to generate useful data, we proposed that there should be a State level IT platform to ease data compilation.

It was our vehement refusal to depend on secondary data and unshaken demand for real time data that paved way to establishment of EIU. State Epidemic Intelligence Unit of Gujarat can be seen as a prototype of the big data analysis techniques those are bound to become the part and parcel of tomorrow's healthcare.

Acknowledgment

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Use of Opportunistic Screening for Hypertension and Diabetes among the Patients' Attendees in a Tertiary Care Hospital of Mangalore

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Abstract:

Introduction: Hypertension and Diabetes are two of the most common chronic non-communicable diseases and multifactorial disorders affecting both developed and developing countries. Method: A cross sectional study was conducted for a period of 3 months among patients' attendees above the age of 30 years in a tertiary care hospital of Mangalore, between July - September 2018. Data was collected from 150 patient attendees by personal interviews followed by anthropometry, blood pressure measurement and random blood sugar and entered into Microsoft excel. Analysis was done using Statistical package for social sciences (SPSS) software version 21. Results: It was seen that 72(48%) were Normotensive, 44 (29.3%) were Prehypertensive and 34 (22.7%) were Hypertensive while 65(43.3%) had a random blood sugar of > 140 mg/dl. There was an association between hypertension and age, gender, type of family, occupation, religion, alcohol intake, smoking habits and physical activity which was statistically significant (p< 0.05). While age more than 45 years, illiteracy, belonging to Christian faith, having a family history of diabetes mellitus and being obese/ overweight were associated with a random blood sugar of >140 mg/dl which was statistically significant (p< 0.05). It was also seen that 23(67.6%) of hypertensive attendees and 18(40.9%) of prehypertensive attendees also had diabetes as a comorbidity. **Conclusion:** Opportunistic screening of individuals for hypertension and diabetes will help in early detection of these diseases. This will help in early prevention and timely treatment.

Keywords: Diabetes, Hypertension, Opportunistic Screening, Prevalence.

Introduction:

Type 2 diabetes mellitus (DM) and Hypertension (HTN) are among the most common chronic non-communicable diseases and multifactorial disorders affecting both developed and developing countries.^[1] Diabetes mellitus is the single most important metabolic disease recognized worldwide as one of the leading cause of death and disability. It has been estimated that presently in India 19.4 million individuals are affected by diabetes.^[2] World Health Organization (WHO) has already declared India as the global capital of diabetes and has predicted number of diabetics to be nearly 80 million by2030.^[2] On the other hand, prevalence of hypertension (HTN) among adults is expected to rise by 60% resulting in a total of 1.56 billion affected individuals by2025.^[3]

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Approximately 70% of diabetics are hypertensive, as diabetics are prone to HTN twice more likely than normoglycemic individuals. Similarly, the presence of HTN precedes the onset of diabetes mellitus (DM).^[3] The presence of hypertension in diabetic patients substantially increases the risks of coronary heart disease, stroke, nephropathy and retinopathy. Also the risk of cardio vascular disease is increased by 75%, which further contributes to the overall morbidity and mortality of an already high risk population.^[4] Epidemiological and clinical studies have shown that these diseases often cluster in individuals and in families.^[1]

Most of the people in India are not diagnosed and are left untreated which ranges from 30% and 80%, whereas 20%–30% are identified after developing macro- or micro-vascular complications. Poor public awareness and limited opportunities for diagnosis are the main reasons.^[5] Diabetes is usually defined based on fasting or postprandial glucose. However, random capillary blood glucose (RCBG) is the most convenient way to reach large numbers of people.^[6] Also population-based screening result in low yield thereby resulting in a higher cost as seen in few population-based screening studies.^[5]

Therefore, this study was done to screen for hypertension and diabetes among the patient's attendees who accompany the patients coming to the hospitals. This type of opportunistic screening will help identify more number of cases as hypertension and diabetes usually cluster in families.

Method:

A Cross sectional study was conducted for a period of 3 months among patient attendees above the age of 30 years in a tertiary care hospital of Mangalore, between July - September 2018. Included in the study were those who were not already diagnosed with hypertension and diabetes. The attendees who did not give their consent were excluded from the study.

Sample size: Sample size was calculated to be 150 at 5% alpha error and using the prevalence of

hypertension in a previous study which was 40%.^[7] Formula used to calculate was $4pq/l^2$, where p= prevalence, q=100-p, l is permissible error which was taken as 20% of P(relative precision).

Data collection: The study was conducted after getting the ethical committee approval. All the patients' attendees qualifying the inclusion criteria were interviewed till the sample size was reached. Data regarding socio-demographic profile, life-style and habitual behaviors (smoking and alcohol intake) were collected using a questionnaire previously validated in Indian subjects.

Anthropometry: Height, weight, waist, and hip circumference were measured using stadiometer, digital weighing machine and measuring tape, as per WHO international manual.

Body Mass Index(BMI) was calculated and classified as $\text{below}^{^{[8]}}$

Normal : 18.5-24.9 Overweight: 25.0-29.9 Obesity: >30

Blood pressure measurement: It was done using sphygmomanometer and stethoscope. Blood pressure was measured in the left arm in a sitting posture before filling the questionnaires and subsequent 2nd reading was taken after 5 min of rest and 3rd reading was recorded after the completion of the questionnaires and final average reading was considered for analysis.

The classification of hypertension was done based on Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure 7(JNC 7).^[9] Those who have systolic blood pressure >140 mmHg and/or diastolic blood pressure >90 mmHg were classified as hypertensive. Systolic blood pressure of 120-139 mmHg and or diastolic blood pressure of 80-89 mmHg were classified as pre-hypertensive.

Random blood glucose: It was measured using a glucometer. Blood for the test was collected by a

finger pin prick after cleaning the finger with an alcohol swab. Using the 2-hour plasma glucose >200 mg/dl criterion, the random capillary blood glucose (RCBG) cutoff point of 140 mg/dl gave the highest sensitivity and specificity.^[6] Hence RBS >140mg/dl was taken as positive for diabetes screening.

Physical activity : WHO defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure. Physical activity refers to all movement including during leisure time, for transport to get to and from places, or as part of a person's work. Popular ways to be active include walking, cycling, wheeling, sports, active recreation, and play.^[10]

Statistical analysis: Data was entered in Microsoft excel and SPSS software version 21 was used for statistical analysis. The categorical variables were presented using frequency and percentages. Chisquare test was used to find the association between different variables. Multinomial logistic regression was performed to know the association between socio-demographic features and habits of study participants with blood pressure, whereas Binomial logistic regression was done to know the association between socio-demographic features and habits of study participants with the random blood sugar. p<0.05 was considered as statistically significant value.

Results:

In this study 150 patient attendees were interviewed and it was seen that majority of them 97(64.7%) belonged to 30-45 years' age group, 82(54.7%) were males, 38(25.3%) had completed pre-university education while 16 (10.7%) were illiterates. (Table1)

On assessing the risk factors among the study participants, it was seen that 8 (5.3%) reported that they were stressed up, 50(33.3%) had family history of hypertension and 44(29.3%) had family history of diabetes. Alcohol consumption was seen in 30(20%) of the study participants and 14(9.3%) of study participants were smokers. (Table 2)

Socio-demographic characteristics		Frequency (%)
	30-45 years	97(64.7)
Age	46-60 years	49(32.6)
	61-75 years	4(2.7)
Condon	Female	68(45.3)
Gender	Male	82(54.7)
	Illiterate	16(10.7)
	Primary	15(10.0)
Education	Middle and high	23(15.3)
Education	Pre-university	38(25.3)
	Graduate	37(24.7)
	Post graduate	21(14.0)
	Professional	8(5.3)
	Semi professional	51(34.0)
Occupation	Skilled	13(8.7)
	Semi-skilled	18(12.0)
	Unskilled	8(5.3)
	Unemployed	52(34.7)
	Married	132(88.0)
Marital	Unmarried	12(8.0)
status	Widow	2(1.3)
	Divorced	4(2.7)
	Hindu	76(50.7)
Religion	Muslim	56(37.3)
	Christian	18(12.0)
Type of	Nuclear	24(16.0)
family	Three generation	121(80.7)
iaiiiiiy	Joint	5(3.3)

Socio-demographic characteristics	of
study participants (n=150)	

On assessing the BMI of the study participants, 59 (39.3%) were overweight while 23 (15.3%) were obese. When asked about duration of physical activity, 67(44.7%) of the study participants mentioned that they are physically active for 30minutes-1hour every daywhile 57(38%) were active for 15-30 minutes. (Table 2)

Study variables		Frequency (%)
Presence of *	Perceived Stress	8(5.3)
	Family history of Hypertension	50(33.3)
	Family history of Diabetes	44(29.3)
	Vegetarian	33(22.0)
Eating	Non vegetarian	115(76.7)
Eating habits [#]	Oily food	140(93.3)
	Fast food consumption	113(75.3)
	Eating outside	114(76.0)
Other habits*^	Alcohol consumption	30(20.0)
	Tobacco smoking	14(9.3)
BMI	Normal (18.5-24.9)	68(45.4)
	Overweight (25.0 - 29.9)	59(39.3)
	Obesity (≥30)	23(15.3)
Duration of physical activity	15-30 minutes	57(38.0)
	30 minutes-1 hour	67(44.7)
	1-2 hours	26(17.3)

Table 2: Distribution of the study participantsbased on the risk factors

*Multiple options were selected by the study participants.

#Those consuming oil fried foods and fast foods twice a week were considered

^ Those consuming alcohol and smoked once a week

On classifying Hypertension according to the JNC-7 criteria, 72(48%) were Normotensive, 44 (29.3%) were Pre-hypertensive and 34 (22.7%) were Hypertensive. It was observed that 65(43.3%) had a random blood sugar of > 140 mg/dl. (Table 3)

It was observed that there was an association between hypertension and socio demographic variables like age, gender, type of family, occupation, and religion. Association was also observed with habits like, alcohol intake, smoking and physical activity duration and was statistically significant. (Table 4)

Multinomial regression was done to know the association of socio-demographic features and habits of study participants with blood pressure.

Table 3:	Distribution of the study participants
	based on Blood pressure and Random
	Blood Sugar

Risk factors		Frequency (%)
Blood Pressure	Normal	72(48.0)
	Pre hypertensive*	44(29.3)
	Hypertensive**	34(22.7)
Random blood sugar	<140mg/dl	85(57.7)
	≥140 mg/dl	65(43.3)

*Systolic BP of 120-139 mmHg and Diastolic BP of 80-89 mmHg

** Systolic BP of >140 mmHg and Diastolic BP of >90 mmHg

Multinomial regression model was subdivided into Model 1(Normotensive vs Hypertensive) and Model 2 (Pre-hypertensive vs Hypertensive). Model 1 showed that age (46-75 years), gender (female), occupation (employment) and Model 2 showed that age (46–75 years), occupation (gainful employment) and smoking habit were associated with increased blood pressure and this was found to be statistically significant. In Model 1, it was observed that those > 45 years of age were 8 times, [Adjusted OR=8.20 (C.I.: 1.53, 43.72)] females were 7 times, [AOR=7.09 (C.I. :1.06, 47.28)] and those gainfully employed were 10 times, [OR=10.03 (C.I.: 1.06, 94.45)] more likely to be have hypertension as compared to Normotensive individuals. Similarly, in Model 2, it was observed that those > 45 years of age were 8 times, [AOR=8.61 (C.I.: 1.64, 45.05)], those gainfully employed were 275 times, [AOR=275.56 (C.I.: 10.53, 7210.10)] and those who smoke were 12 times, [AOR=12.22 (C.I.: 1.31, 113.339)] more likely to be Hypertensive as compared to Pre-hypertensives. (Table 5)

It was observed that most of the study participants who were above 45 years age, illiterate, belonging to Christian faith, having a family history of diabetes mellitus, obese/overweight and those doing physical activity of 1- 2 hours duration were associated with a Random blood sugar of> 140 mg/dl which was statistically significant; those in the age group of 46-75 years were more than 5 times, OR=5.7 (C.I. 2.74, 11.86), Christians were more than 2 times,

			Blood pressure			
Stu	dy variables	Normal n(%)	Pre- hypertension n(%)	Hypertension n(%)	p value	
Age in years	30-45	53(54.6%)	30 (30.6%)	14 (14.4%)	0.004	
nge in years	46 - 75	19 (35.8%)	14 (26.4%)	20 (37.7%)	0.004	
Condon	Male	60 (73.2%)	13 (15.9%)	9 (11%)	<0.0001	
Gender	Female	12 (17.6%)	31 (45.6%)	25 (36.8%)	<0.0001	
Education	Illiterate	12 (75%)	0	4 (25%)		
Education	Literate	60 (44.8%)	44 (32.8%)	30 (22.4%)	-	
Tupo of family	Nuclear	4 (16.7%)	9 (37.5%)	11 (45.8%)	0.001	
	Three generation/ joint	68 (54%)	35 (27.8%)	23 (18.3%)	0.001	
Occupation	Unemployed	33 (63.5%)	15 (28.8%)	4 (7.7%)	0.003	
Occupation	Employed	39 (39.8%)	29 (29.6%)	30 (30.6%)		
	Hindu	42 (55.3%)	23 (30.3%)	11 (14.5%)	0.003	
Religion*	Muslim	28 (50%)	14 (25%)	14 (25%)		
	Christian	2 (11.1%)	7 (38.9%)	9(50%)		
Family	No	47 (47%)	30 (30%)	23 (23%)	0.041	
hypertension	Yes	25 (50%)	14 (28%)	11 (22%)	0.941	
Family	No	51 (48.1%)	30 (28.3%)	25 (23.6%)	0.075	
of diabetes	Yes	21 (47.7%)	14 (31.8%)	9 (20.5%)	0.875	
	No	68 (56.7%)	30 (25%)	22 (18.3%)	-0.000	
Alconol intake	Yes	4 (13.3%)	14 (46.7%)	12 (40%)	<0.000	
Smolring	No	69 (50.7%)	41 (30.1%)	26 (19.1%)	0.005	
Smoking	Yes	3 (21.4%)	3 (21.4%)	8 (57.1%)	0.005	
Physical	15-30minutes	35 (61.4%)	11 (19.3%)	11 (19.3%)		
activity	30minutes-1hour	30 (44.8%)	27 (40.3%)	10 (14.9%)	<0.0001	
duration	1-2hours	7 (26.9%)	6 (23.1%)	13 (50%)		
	Normal	34 (50%)	22 (32.4%)	12 (17.6%)	0.202	
R R R MI	Overweight / obese	38 (46.4%)	22 (26.8%)	22 (26.8%)	0.392	

Table 4: Association of blood pressure levels with socio demographic variables and habits of study participants

*Fishers exact test

Variable (reference*)			Model 1				Model 2			
		Normotensive Vs hypertensive				Pre-hypertensive Vs hypertensive				
		Wald's	Odds ratio	95% CI		Wald's		95% CI		
		test P value		Lower	Upper	test P value	ratio	Lower	Upper	
Age in years	s (30-45*)	0.01	8.20	1.53	43.72	0.01	8.61	1.64	45.05	
Gender (male*)		0.04	7.09	1.06	47.28	0.08	0.07	0.00	1.44	
Education (illiterate*)		0.55	0.52	0.06	4.51	-	-	-	-	
Occupation (une	employment*)	0.04	10.03	1.06	94.45	0.00	275.56	10.53	7210.10	
Religion	Muslim	0.21	5.59	0.37	84.67	0.10	5.96	0.71	50.11	
(Hindu*)	Christian	0.53	2.41	0.14	40.26	0.32	3.12	0.32	30.49	
Type of fam generatior	nily (three n/ joint*)	0.05	0.17	0.03	1.04	0.42	2.11	0.34	13.01	
Alcohol (yes*)		0.28	3.35	0.36	30.65	0.32	0.40	0.06	2.46	
Smoking (yes*)		0.88	1.17	0.13	10.48	0.02	12.22	1.31	113.33	
Physical	activity	0.26	8.49	0.20	354.81	0.67	0.40	0.00	26.33	
duration (1	-2hours*)	0.07	6.56	0.82	52.30	0.05	11.13	1.00	123.29	

Table 5: Multinomial regression to know the association between socio-demographic
features and habits of study participants with blood pressure

*Reference variables and odds ratio is interpreted based on the reference variable.

OR=2.63 (C.I. 1.57, 4.39), those with a family history of diabetes were 3 times, OR=3.26 (C.I. 1.57, 6.79), overweight/obese were 2 times, OR=2.59 (C.I. 1.32, 5.08) and those physically active for 1-2 hours were 2 times, OR=1.97 (C.I. 1.23, 3.17) more likely to have Random blood sugar > 140 mg/dl. It was seen that illiterates were less likely to have elevated random blood sugar with OR=0.22 (C.I. 0.07, 0.71).

It was observed that when binomial logistic regression was applied and Adjusted OR (AOR) was derived, it was seen that age, religion, family history of diabetes, BMI and physical activity duration were found to be statistically significant after adjusting for other variables; those in 46-75 age group were more than 6 times, AOR= 6.67 (C.I. 2.41, 18.49), Christians were 3 times, AOR= 3.39 (C.I. 1.5, 7.63), those with Family history of diabetes were almost 4 times, AOR= 3.98 (C.I. 1.35, 11.7), overweight/obese were 2 times, AOR= 2.38 (C.I. 1.0, 5.66), and those physically active were 2 times, AOR= 2.25 (C.I. 1.16, 4.37) likely to have random blood sugar > 140 mg/dl after adjusting for other variables.(Table 6)

It was also observed that 23(67.6%) of hypertensive attendees and 18(40.9%) of pre hypertensive attendees also had diabetes as a comorbidity.

Discussion:

Hypertension constitutes one of the important risk factors of non-communicable disease worldwide as per WHO. It is estimated that high blood pressure is the lone risk factor for more than 50% of cardiovascular diseases.^[11] It is seen that about 10-30 % suffer from hypertension worldwide based on JNC 7 report, additionally about 50-60% people can improve their prognosis if they are able to lower the BP.^[12] Studies have shown that an average reduction in blood pressure by about 2-3 mmHg among those with high normal BP would result in 20-25 % reduction in the incidence of hypertension.^[13]

		Random B	lood Sugar		Odds	Adjusted	
Var	iables	<140mg/dl n(%)	≥140mg/dl n(%)	p value	ratio (C.I.)	odds ratio (C.I.)	p value
Адо	30-45years	69 (71.1)	28 (28.96)	.0.001	5.7(2.74,	6.67(2.41,	< 0.001
Age	46-75years	16 (30.7%)	37 (69.8)	<0.001	11.86)	18.49)	< 0.001
Condon	Female	39 (57.4%)	29 (42.6%)	0.055	0.95 (0.55,	, 0.43(0.12,	0 1 8 5
Gender	Male	46 (56.1%)	36 (43.9%)	0.877	1.82)	1.50)	0.105
Education*	Illiterate	4 (25%)	12 (75%)		0.22 (0.07,	0.87(0.16,	0.074
Education*	Literate	81 (60.4%)	53 (39.6%)	0.014	0.71)	4.63)	0.874
Occupation	Unemployed	26 (50%)	26 (50%)		0.66 (0.34,	1.52 (0.47,	0.404
occupation	Employed	59 (60.2%)	39 (39.8%)	0.231	1.23)	4.89)	0.484
	Hindu	54 (71.1%)	22 (28.9%)			3.39(1.5, 7.63)	0.000
Religion	Muslim	26 (46.4%)	30 (53.6%)	0.001	2.63 (1.57,		0.003
	Christian	5 (27.8%)	13 (72.2%)		10,5,5		
	Nuclear	16 (66.7)	8 (33.3)		1.21 (0.56, 2.62)	2.49(0.8, 7.74)	0.115
family*	Three generation	65 (53.7)	56 (46.3)	0.334			
	Joint	4 (80)	1 (20)				
Family	Yes	31 (62%)	19 (38%)		0.72 (0.36, 0.33(0.11	0.33(0.11,	
h/o HTN	No	54 (54%)	46 (46%)	0.386	1.44)	1.0)	0.051
Family	Yes	16 (36.4)	28 (63.6)		3.26 (1.57,	3.98(1.35,	
h/o DM	No	69 (65.1)	37 (34.9)	0.002	6.79)	11.7)	0.012
Alcohol	Yes	16 (53.3%)	14 (46.7%)		1.18 (0.53,	0.74 (0.17,	
intake	No	69 (57.5%)	51 (42.5%)	0.680	2.64)	3.19)	0.680
Smoking	Yes	8(57.1)	6 (42.9)		0.98 (0.32,	2.09 (0.36,	
Shioking	No	77 (56.6)	59 (43.4)	0.970	2.97)	12.24)	0.412
DMI	Normal	47 (69.1%)	21 (30.9%)		2.59 (1.32,	2.38(1.0,	
DMI	Overweight/ Obese	38 (46.3%)	44 (53.7%)	0.005	5.08)	5.66)	0.048
Physical	15-30minutes	41 (71.9%)	16 (28.1%)		1.07 (1.00	2 25 (4.4.6	
activity	30minutes-1hour	33 (49.3%)	34 (50.7%)	0.011	1.97 (1.23,	2.25(1.16,	0.017
duration	1-2hours	11 (42.3%)	15 (57.7%)		5.175	т.57 ј	

 Table 6: Binomial logistic regression to know the association between socio-demographic features and habits of study participants with Random Blood Sugar

*Fisher exact test value

Out of the total 150 people screened in the present study, 22.7% patients were newly diagnosed hypertensives and 29.3% were having pre-hypertension. A large community-based survey done by Rao etal^[11] with respondents aged \geq 30 years in

rural Karnataka found the prevalence of prehypertension to be 43.3%. Another study done by Anindo Majumdar etal^[14] in Puducherry found that 17.9% and 37.7% had pre-hypertension and hypertension respectively. In the present study 11%

males and 36.8 % females had hypertension. In the study done by Anindo Majumdar et al^[14] 64.3% males had hypertension. In our study, 40% individuals who consumed alcohol had hypertension which was almost similar to the study done by Anindo Majumdar et al^[14] wherein 27% with prehypertension and 31% with hypertension consumed alcohol. Overweight/obesity (BMI>25) was a risk factor in our study with 26.8 % of them having hypertension and the finding was much lower than the study done by Anindo Majumdar et al^[14] where 63.03% study participants with a BMI of more than 25 had hypertension. Advancing age, female gender, illiteracy, belonging to a nuclear family, employment status, belonging to Christian faith, indulging in habits of smoking, alcohol intake and increased physical activity duration were identified as significant correlates in our study based on multivariate analysis. This is in conformity with other studies done in India and overseas.^[1,4,10,11,15]

Random Blood Sugar (RBS)of ≥140mg/dl was taken as cut off to screen for diabetes. Inthe present study, 43.3 % were screened to be positive for diabetes. A Study done by Anindo Majumdar et al^[14] showed that 17.3% were diagnosed with diabetes. A study done to screen diabetes using public health system by Selvavinayagam TS^[15] showed that 4.27% had diabetes. This low prevalence might be because this study was done on a large scale which included 35 million populations and was done in the community. Risk prediction strategies followed by targeted screening with blood sugar could have increased the proportion of diabetes individuals in such studies.^[5] Opportunistic screening is a good way to detect high blood sugar patients early so that such patients would be prevented from going into micro and macro vascular complications which would lead to a huge economic burden in the complications management There is strong evidence from studies done in UK to carry out opportunistic screening every five years for people older than 40 years and yearly if there are risk factors suggestive of diabetes. Such screening would help identify most of the cases in the community providing a strong rationale to undertake such opportunistic screening. $^{\rm [16]}$

In our study 42.9 % of smokers had diabetes whereas in the study done by Anindo Majumdar et $al^{[14]}17.9$ % were smokers who had diabetes. In a study done by Venugopal V et $al^{[5]}$ 21% were current tobacco users.

In present study 53.7 % individuals who were obese had diabetes which was similar to the study done by Anindo Majumdar et $al^{[14]}$ where 46.2% of obese had diabetes as well as Venugopal V et $al,^{[5]}$ which had 54.3 % overweight/obese.

Conclusion:

The present study showed that 43.3 % of patient attendees had RBS level more than140mg/dl while 22.7% patients were newly diagnosed with hypertension and 29.3% were found to have prehypertension. On classifying hypertension based on JNC-7 criteria, it was seen that more than half of the study participants were either prehypertensive or hypertensive which in itself is a risk factor for diabetes as there was a statistically significant association between hypertension and random blood sugar levels.

Opportunistic screening of individuals for Hypertension and diabetes will help in early detection of disease and in identifying of risk factors along with saving of resources like money, materials, manpower and time that gets wasted in community survey.

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Declaration:

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Sleep Quality in End Stage Renal Disease Patients Undergoing Hemodialysis in a Tertiary Care Center in Rural Kanyakumari: A Cross Sectional Study Priya R Panicker¹, Sivakarthik K²

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Abstract:

Introduction: End Stage Renal Disease (ESRD) has increased in prevalence worldwide, becoming a major public health problem. About 80% of ESRD patients have subjective complaints of poor sleep. Poor sleep quality can potentially affect their quality of life and the pattern of medication use. Hence this study was designed to evaluate the quality of sleep in patients undergoing haemodialysis and to determine associated risk factors. **Method:** This cross sectional study was carried out among 110 ESRD patients in the dialysis unit of Kanyakumari hospital. Patients previously diagnosed with neuropsychiatric disorders, sleep apnoea or epilepsy were excluded. An investigator-administered structured questionnaire was used. Sleep quality was assessed using the Pittsburg Sleep Quality Index. A global PSQI score of more than 5 indicates poor sleep quality. **Results:** Mean age of ESRD patients was 52.7 years. About 71% of the patients were males. Majority of the patients (68.2%) had pre-existing Diabetes and Hypertension. Almost all of the patients (97.3%) had a PSQI score of more than 5 and were 'poor sleepers'. About 94.7% patients had not used sleep medications at all. Increasing age and multiple morbidity were found to be statistically significant risk factors of poor sleep quality. **Conclusion:** Almost all of our subjects had poor sleep quality sleep and only few of them sought treatment for the same. Early detection of poor sleep quality will help in better management of sleep disorders among ESRD patients.

Keywords: End Stage Renal Disease, Hemodialysis, Sleep quality

Introduction:

Chronic kidney disease and End Stage Renal Disease (ESRD) have become public health problems worldwide. In India per year over 1,00,000 people are diagnosed with ESRD. The prevalence of ESRD in India is 152 per million population.^[1] The poor quality of sleep can negatively affect persons emotions, cognitive process, motivation and ability to focus which in-turn leads to loss of appetite, anxiety, nervousness, depression. Similar to general population, increased stress, anxiety, depression and worry are associated with poor sleep quality in dialysis patients.^[2] The reported prevalence of poor sleep including waking up and breathing disorders during the sleep period and excessive sleeplessness are in the range of 45-80%.^[3] It has been reported that 80% of ESRD patients receiving dialysis report sleep complaints with day time sleepiness being most common reported symptom.^[4] Sleep issues are not only associated with the quality of life (QOL) but also

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with increased health-related risks and mortality in these patients. Poor sleep quality affects many hemodialysis patients and can potentially predict their morbidity, mortality, quality of life and the pattern of medication use.^[5] Sleep issues have a negative impact on immune response and also cause development of cardiovascular disease, which is the most important cause of death in all patients with renal disease.^[6]

According to Hildreth, patients with Chronic Kidney Disease (CKD) exhibit sympatho-vagal imbalance due to baroreceptor reflex function impairment.^[7] As the individuals goes through the cycles of (Rapid eye movement) REM and non - REM sleep there are oscillations in the sympatho-vagal balance and plasma renin levels. Plasma renin activity and aldosterone activity peaks during NREM sleep and lowers during REM sleep. In patients with sleep deprivations the oscillatory nature of the plasma renin aldosterone activity is absent.^[8] It is believed that lack of nocturnal blood pressure dipping is the important risk factor for the progression of CKD.^[9] Patients with ESRD typically exhibit poor sleep architecture as measured objectively on polysomnographic studies.^[10] In a comprehensive review, ESRD patients had short, fragmented sleep with decreased total sleep times. Sleep efficiencies ranged between 66%-85% and time spent awake ranged from 77-135 min. Sleep latencies were reported below normal. There was a pattern of increased stage 1 and stage 2 sleep while slow wave sleep and REM sleep were decreased. Daytime sleepiness is a parameter not measured by polysomnographic studies but is still considered an important marker of inadequate sleep.^[10]

Previous studies have demonstrated the association between sleep disturbances and physical and mental well-being in the dialysis patients.^[11] Although many of the dialysis patients complain about sleep deprivation, an objective assessment of sleep quality with a proven tool like Pittsburg sleep quality index will be better in quantifying the poor sleep quality among ESRD patients. Literature about the factors affecting sleep quality is also lacking from rural areas of Tamil Nadu. Hence this study was designed to measure the quality of sleep in patients undergoing hemodialysis and to determine the associated risk factors.

Method:

This was a cross sectional study carried out in the dialysis unit of a tertiary care centre in rural Kanyakumari, the southernmost district of Tamil Nadu from October to November 2020. The study participants included clinically stable adult Stage 5 CKD patients (End Stage Renal Disease)who were registered with this dialysis centre during the study period and underwent maintenance haemodialysis for at least 6 months. Subjects were selected by purposive sampling. Patients who were previously diagnosed with neuropsychiatric disorders or Obstructive Sleep Apnoea (OSA) or those on anticonvulsant drugs were excluded from the study. Sample size was calculated based on the reported prevalence of insomnia among ESRD patients being 50% as reported by Merlino et al. and a relative precision of 20% to get 100 subjects.^[12] A non response rate of 10% was added to get a final total of 110 subjects.

The subjects were recruited according to eligibility criteria by a trained investigator. Data was collected using a pre-designed structured questionnaire administered by the investigator. The questionnaire was designed to capture demographic details of the patients, their clinical history and their sleep quality. Sleep quality was assessed using the Pittsburg Sleep Quality Index(PSQI) which is a scale used to assess the sleep habits of the subjects over the past month using a set of 19 self rated questions and five questions to be rated by the bed partner if available. Only the 19 self rated questions are included in the scoring for calculating the global PSQI score. PSQI assesses seven components, that is, sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep

medication and day time dysfunction. Each component is scored from 0-3, yielding a global PSQI score with continuous scores ranging from 0 to 21 with higher scores indicating lower quality of sleep and a score more than 5 indicating poor sleep quality.^[13] Since the spouses were not available most of the time, their substantiation of the patients' sleep habits could not be collected for all the patients and hence only the self rated questions were included for analysis. Age, gender, associated medical conditions, multiple morbidity (2 or more medical conditions) and duration of hemodialysis more than 1 year were the independent variables analysed for association with poor sleep quality.

Patient information was collected after obtaining informed consent and patient confidentiality was maintained by assigning identifying numbers. Data entry was done in Microsoft Excel 2010 and data analysis was done on SPSS software trial version 20.0. Continuous scores are described with mean and standard deviations. Descriptive statistics, Chi-square tests, independent t tests and Pearson correlation coefficient (r) were used for data analysis with significance level fixed at 5% (p value < 0.05).

Results:

Demographic profile:

In this study, 110 patients undergoing haemodialysis were interviewed, majority of whom(71%) were males. The age of the study participants range from 18 to 79 years with the mean age being 52.7 ± 13.3 years. In the age group 18 to 40 years, gender distribution was equal but there was male predominance in higher age groups of 41 to 60 and above 60 years (at 76.3% & 72.9% respectively).

Clinical history:

Regarding associated medical conditions leading to or coexisting with CKD, a majority of the patients (68.18%) suffered from both Diabetes mellitus and systemic Hypertension. A quarter of patients suffered from hypertension alone (25.45%), while 5.45% had diabetes alone with a single patient (0.9%) reporting a history of systemic lupus erythematosus(SLE).

Quality of Sleep:

The mean global PSQI score of the patients was 13.49 with no statistically significant difference between scores in case of gender, as per independent t test (P value0.429). The minimum score was 1 and maximum score was 17. Almost all of the patients (97.3%), ie, 107 patients had a PSQI score of more than 5 and were considered as 'poor sleepers'. Only 3 patients (2.7%) had a score less than or equal to 5 and had good sleep quality (good sleepers).The distribution of scores of the patients and their gender differences across the seven components of PQSI are as given below in Table 1.

Around 65.5% patients had a long sleep latency as in it took them longer to fall asleep very frequently. Almost all patients (99.1%) had a habitual sleep efficiency of less than 65%. About 94.7% patients claimed not to have used sleep medications at all. Sleep quality had no effect on daytime functioning only in 10.9% of patients while others experienced daytime dysfunction in varying degrees from slight to big issues in daily life (35.5% and 6.4% respectively).

Factors associated with Sleep quality:

On univariate analysis, age was the most important risk factor associate with poor sleep quality. (Table 2) Age had a statistically significant positive correlation with the global PSQI score (r +0.36), meaning increasing age will have higher scores and poorer sleep quality. Habitual sleep efficiency, which is the percentage of actual sleep hours out of total hours spent in bed, also had statistically significant positive correlation with the global PSQI score(r+0.3, p 0.001).

Moreover patients suffering from multiple morbidity (2 or more medical conditions) had a higher mean global PSQI score than those with a single medical condition (mean PSQI score 14.23 versus 11.91; t 3.89, p value< 0.01). There were no

DEOI Componente	Frequency		Mean Score <u>+</u> -SD)	
PSQI Components	rrequency	Male	Female	Total	
Component 1: Subjectiv	e sleep quality	•	·	•	
Very good	3				
Fairly good	26	217.000	2.02 . 0.00	2 14:0.07	
Fairly bad	34	2.17 <u>+</u> 0.86	2.03 <u>+</u> 0.89	2. 14 <u>+</u> 0.87	
Very bad	47				
Component 2: Sleep late	ency [#]	4.59 <u>+</u> 1.6	4.62 <u>+</u> 1.7	2.49 <u>+</u> 0.82	
Component 3: Sleep du	ration	-	-	-	
>7 hours	9				
6-7 hours	7		26.00		
5-6 hours	9	2.6 ± 0.8	2.3 ± 1.1	2.33 <u>+</u> 0.95	
< 5 hours	85				
Component 4: Sleep effi	ciency		•		
>85%	0				
75-84%	1		2,01	209 10 10	
65- 74%	0	2.97 ± 0.2	3 <u>+</u> 0.1	2.98 <u>+</u> 0.19	
<65%	109				
Component 5: Sleep dis	turbances [#]	1.67 <u>+</u> 0.5	1.65 <u>+</u> 0.6	1.66 <u>+</u> 0.53	
Component 6: Use of Sle	ep medication				
Not in past month	104				
< Once a week	3		0	0.09 + 0.26	
Once/twice a week	3	0.1 ± 0.4	0	0.08 <u>+</u> 0.30	
>Three times a week	0				
Component 7: Daytime	dysfunction [#]	1.6 <u>+</u> 0.8	1.53 <u>+</u> 0.9	1.59 <u>+</u> 0.89	
Global PSQI score		12.7 <u>+</u> 2.9	12.53 <u>+</u> 3.3	13.49 <u>+</u> 3.08	

Table 1: Gender differences in PSQI component scores in ESRD patients [n=110]

Standard deviation (SD), #Composite score

other statistically significant associations found among gender, multiple morbidity or other demographic variables with the PQSI scores or its components.

Discussion:

This study has revealed that a large amount of

hemodialysis patients suffer from poor sleep. The prevalence of poor quality sleep in the present study was 97.3%. This is markedly higher than the prevalence of poor sleep quality reported by Walker et al.(83.5%)and Masoumi et al. (86.6%)while being slightly higher than 90.87% prevalence of sleep problems among hemodialysis patients reported by

Outcomes	Factors	p value*
	Age	0.000 (r+0.36) [#]
Global PSQI score	Multiple morbidity	0.000 (t 3.89) ^s
	Gender	0.429
Habitual cloop officion cu	Age	0.001 (r+0.306) [#]
Habitual sleep efficiency	Gender	0.117
Sleep disturbances	Age	0.000 (r +0.341) [#]
Multiple morbidity	Poor Subjective Sleep Quality	0.027 (χ ² 4.92)

Table 2: Factors affecting sleep quality

* Very high statistical significance; #Person correlation; \$ Independent t test

Mehrabi et al.^[14-16] However Walker et al. only examined subjective complaints of disturbed sleep through a sleep questionnaire, with daytime sleepiness being the most common complaint.^[14] On the other hand, Mehrabi et al obtained 90.87% poor sleep quality using the same PSQI scale among similarly aged long term hemodialysis patients in Iran.^[16]

Rai et al from New Delhi described a self reported prevalence of insomnia at 60.9% but the diagnosis of insomnia was based on frequency of symptoms experienced by dialysis patients. This lower prevalence could be due to underreporting of sleep symptoms to the treating physician by the patients. Rai also reported higher prevalence of insomnia among patients older than 55 years and those who had been on dialysis for over a year. ^[17] These results show that dialysis patients commonly experience sleep problems and most of them have poor quality of sleep. In the present study also, we found an increasing prevalence of poor sleep quality with increasing age. Yoshioka et al. found that advanced age affects patients experiencing sleep problems.^[18] Age more than 60 years was a statistically significant associated risk factor of sleep disturbance, as per Walker et al.^[14] It is important to note that the mean age of men and women diagnosed with end stage renal diseases increased from 40 to 59 years in India, similar to our study population, in which the mean age of patients was 52.7 years.^[19]

In addition, our results show that patients having multiple morbidities (two or more medical conditions) are more likely to report decreased sleep quality. Mehrabi et al also reported similar findings of diabetic patients having poorer sleep quality than nondiabetic patients.^[16] Also, the sleep quality in males was lower than that of females, although this was not statistically significant. This is similar to the findings of Walker et al. where males had more sleep wake complaints than females. ^[14] Varying gender differences are reported in other studies with somereporting that females had more sleep problems than males while others reported the reverse.^[20] Hemodialysis patients in this study had more problems in their functionality during daytime, which has been proven to affect their day time alertness, activity level, the incidence of accidents and overall well-being.^[1]

Santhosh Pai et al. also reported a high prevalence of sleeplessness using the PSQI scale, with females having poorer sleep quality than males. But some patients had snoring and other sleep apnoea symptoms which could be the reason for poorer sleep quality. Their study also reported a higher PSQI score among those patients who were in the initial months of HD.^[21] Our study did not study the effect of HD duration on sleep quality. Also, we had excluded patients with sleep apnea from our study.

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The main limitations of the present study are the selection of patients from the dialysis unit and a lack of a suitable control group from the community, which means the findings are not generalizable to the general population. Only self-rated responses were obtained in PSQI scale as spouses and room partners were not available at that time. The effect of stress of the disease, availability of family support and financial burden due to hemodialysis were not evaluated as factors affecting the sleep. These may be the potential confounders. Also, the sample size was comparatively low. Larger prospective longitudinal studies are needed to confirm the high prevalence of impaired quality of sleep. The PSQI survey is a simple tool offering comprehensive information on sleep quality. Therefore, the PSQI scale should be encouraged in all dialysis units since it presents the first step to detect poor sleepers in order to begin a more accurate procedure for early diagnosis and treatment of sleep disorders among ESRD patients.^[22]

In addition to medical treatment to eliminate sleep problems and increase the sleep quality of ESRD patients, the implementation of sleep hygiene interventions could also be beneficial. These interventions include an environment with comfortable room temperature and ventilation, minimal noise, a comfortable bed and proper lighting. They should be applied to each patient's personal routine.^[23] A counseling program that encourages exercise and smoking cessation, as well as other therapeutic methods, can help patients who suffer from poor sleep quality.^[24]

Conclusion:

Almost all of our subjects had poor quality of sleep and only few of them sought treatment for the same. This risk of poor sleep quality can potentially affect their quality of life and aggravate their existing health risks. The sleep characteristics of hemodialysis patients need to be routinely evaluated. Early detection of poor sleep quality will help in better management of sleep disorders among ESRD patients. Further research should focus on identifying new methods and treatment techniques aimed at improving sleep quality among ESRD patients.

Declaration:

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Awareness Regarding Gestational Diabetes Mellitus among Antenatal Women of Rural West Bengal : A Mixed-method Study

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Abstract:

Introduction: Awareness regarding Gestational Diabetes Mellitus (GDM) among antenatal women is necessary for early diagnosis and management of the disease for ensuring a safe motherhood and a healthy child. **Objective:** This study envisaged to assess the awareness regarding GDM and its determinants among antenatal women attending healthcare facilities in a rural area of West Bengal and to explore the perspectives of health workers with regard to gaps in proper awareness generation activities among antenatal women. Method: This mixed-method study was conducted from April 2021 to July 2021 at 4 health facilities in Singur, West Bengal. Quantitative data were collected from 195 antenatal women using a pretested questionnaire which were analysed using SPSS software. Qualitative data were collected via indepth interviews among 6 health workers working in the health facilities and were analysed thematically. **Results:** Overall, 75.4% of participants were not aware of GDM. Multivariable logistic regression analysis showed that secondary education and below (AOR=3.48, 95% CI=1.63-7.42), no history of GDM among family & relatives (AOR=7.24, 95% CI=2.12-24.66), lesser number of antenatal visits (AOR=3.48, 95% CI=1.63-7.42) and non-receipt of counselling regarding GDM during antenatal visits (AOR= 3.09, 95% CI =1.45–6.58) had a significant association with poor awareness. From health workers' perspectives, lack of reorientation training, shortage of supplies for testing, and overburdening with other responsibilities were the major gaps identified in proper awareness generation activities. **Conclusion:** Present study revealed majority of study participants possessed poor knowledge regarding GDM. Reorientation training of health workers, organizing awareness campaigns at the community level, and relevant counselling regarding GDM during each antenatal visit should be given utmost priority for improving knowledge about the disease.

Keywords: Awareness, Gestational Diabetes Mellitus, Mixed-method, Rural

Introduction:

According to the International Diabetes Federation (IDF), worldwide, 1 in 6 live births (20 million) is affected by hyperglycemia in pregnancy, 84% of which have gestational diabetes mellitus (GDM).^[1] GDM is defined as any degree of glucose intolerance with onset or first recognition during pregnancy.^[2,3] As per IDF report on 2019, the prevalence of GDM in the Southeast Asian region and India is estimated to be 27% and 28.5% respectively.^[1] Evidences show that, in India, women are at much higher risk of developing glucose

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intolerance during pregnancy as compared to white women. In pan India study conducted by The Federation of Obstetric and Gynaecological Societies of India (FOGSI) and Diabetes in Pregnancy Study Group of India (DIPSI) shows about 1/3rd of the pregnant women are diagnosed with GDM during the 1st trimester and over a quarter of them have a history of fetal loss in the previous pregnancies.^[4] Awareness of the condition among antenatal women will result in the prevention of the disease through lifestyle modification, better healthcare-seeking patterns, screening, early diagnosis, better self-care practice, and management.

However, studies around the world have shown a low level of awareness regarding the same among pregnant women. A study done by Almutairi et al.^[5] has found four out of five women (79.5%) to have a poor level of awareness toward the impact of maternal DM on the infant. Studies done in Uganda (Byakwagaet al)^[6] and Bangladesh (Bhowmik et al)^[7] found around 69% and 73.7% of women respectively do not have any awareness about GDM. Shriraam, et al,^[8] in Tamil Nadu has found only a small proportion of rural antenatal women (17.5%) to have good knowledge about GDM.

As per the National Guidelines on Diagnosis and Management of GDM, 2014, revised in February 2018, the Government of India (GOI) integrated GDM diagnosis and management within antenatal care package in public health system. It recommends universal screening of pregnant women for GDM during antenatal period. Despite improvements in the access to antenatal care services across the country, there still remain gaps in providing some essential components such as awareness generation, universal testing and management of GDM.^[4]

It is the responsibility of the health system to generate awareness regarding such an important health issue like GDM. Understanding the stakeholders' perspectives, like the health workers, will help us understand the gaps in the delivery of essential components to achieve this goal. Hence qualitative exploration, in addition to quantitative data is much more apt considering the current scenario.

With this backdrop, this mixed-method study was envisaged to assess the awareness level regarding GDM and its determinants among antenatal women residing in a rural area of West Bengal and to explore the perspectives of health workers with regard to gaps in proper awareness generation activities among antenatal women.

Method:

A descriptive cross-sectional study was conducted using mixed-method (both quantitative and qualitative)approach from April 2021 to July 2021 among the beneficiaries and service providers of the antenatal clinics of 4 randomly selected health centres in the field practice area of All India Institute of Hygiene and Public Health, Singur of Hooghly district, West Bengal.

Sampling: The study population for the quantitative part, were all the pregnant women availing antenatal care in these health centres who registered for antenatal care in the last 1 year before the start of data collection. Unwilling women, those who didn't give written informed consent were excluded from the study. A study done in Tamil Nadu^[8] showed prevalence of poor awareness regarding GDM among antenatal women to be 25.8%. So sample size for this study was calculated taking p= 0.258, confidence level-95%, Z value-1.96 and relative error of precision 25%, using the standard Cochran's formula,^[9] i.e., sample size = $Z^2 pq/d^2 = (1.96)^2 \times 0.258$ x 0.742/ $(0.0645)^2$ =176.7 i.e., 177 Taking 10% as non-response the final sample size came to be 177 + 18 = 195.

The first stage of the multistage sampling technique comprised of random selection of 4 health centres from the list of 6 health centres via lottery method under RHU&TC, Singur. Line-listing from the ANC register for all the pregnant women fulfilling eligibility criteria, was then done in the 2nd stage. In the third stage, proportionate allocation for each health centre was done according to the sample size. After that, participants were finally selected randomly by lottery method from the available list of each health centre.



Figure 1: Flow chart showing the sampling procedure

For the qualitative part of the study, 6 field health workers working in these health centres (for at least 1 year duration) were purposively selected. It was ensured that from each health centre, at least one health worker was interviewed at first before going for next health worker from the same health centre. Data was collected till the point of data saturation Only those who were willing and gave informed written consent were included in the study.

Data Collection, Study Tools, and Parameters Used:

Study technique for the quantitative part of the study was face to face interview using pre-tested, pre-designed structured questionnaire. This tool was translated in Bengali language and pre-tested among 30 similar antenatal women outside study settings. It consists of:

I) socio-demographic, clinical, obstetric, antenatal service-related variables, sources of information

ii) Awareness regarding GDM among pregnant women was assessed with the help of a 20 item scale which was prepared after extensive literature review. It encompassed the following domains: natural history (2 items), risk factors (5 items), diagnosis (2 items), treatment (3 items), severity (4 items), prevention (3 items), beneficial activities to prevent GDM (1 item). Reliability of the scale was checked with Cronbach's alpha (0.69) along with inter-item correlation. Face & content validity was checked by public health experts.Each item was given the option of 'Agree', 'Don't know' and 'Disagree' except the 2 items under the domain Knowledge on diagnosis of GDM (2 items), which was provided with options with only one correct response. Each correct response was given a score of 1 and incorrect response 0. The total score was calculated by adding the score of each item (ranged from 0 to 20). The cut off for having poor awareness was taken to be 50% of the attainable total scores i.e. 10. This means, those who scored 10 and below were considered to have poor awareness regarding GDM.

Simultaneously, for the qualitative part of the study, Key informant interviews (KIIs) using predesigned pre-tested semi-structured interviewer guide, audio recorder and field notes, were conducted. Data collection was done till the point of data saturation. Field Health Workers were interviewed regarding their perspective on gaps in delivery of essential components for proper diagnosis and management of GDM (H1= working for 8 yrs in PHC, H2=working for 5 years in PHC, H3=working for 7 yrs in SC, H4= working for 4 yrs in SC, H5= working for 3 yrs in PHC, H6= working for 0 yrs in PHC). The time duration of each interview was around 20 minutes.

Data Analysis:

Quantitative data was analysed using Microsoft Excel 2016 and Statistical Package for Social Sciences software (version 16). Descriptive statistics for the predictor variables and the outcome variable (Awareness regarding GDM among pregnant women) were shown by frequency table, mean, median and interquartile range. Factors were then seen by test of significance (p-value<0.05) at 95% confidence interval in Univariate Regression Model after excluding multicollinearity. The final multivariable model included all the biologically plausible significant predictors in the respective univariate analysis.

Codes were used to extract information from the KIIs. The assessment was done regarding the gaps in proper awareness generation activities from the transcripts of the recorded KIIs. The responses of the participants were coded based on the guides developed beforehand. Simultaneously, the field notes were also considered side by side to put the codes in appropriate context. Similar codes were put together and themes were generated.

Ethical Approval: Permission was taken from Institutional Ethics Committee of All India Institute of Hygiene and Public Health. Informed written consent was taken from each participant before data collection. Confidentiality was maintained throughout the process.

Results:

Among the 195 participants, median age of the study participants was 24 years {Interquartile Range (IQR)=22-28}. Majority of them were Hindu (89.2%) housewives (92.8%). Regarding socio-economic status (income calculated using BG Prasad scale^[10] for May 2021,Consumer Price Index (CPI) = 119.6),^[11] most of them belonged to class II (40%) followed by class I (32.8%). The median per capita income was 2250 (1285.7-3125).Most of the women had completed secondary education (31.8%).

Clinical characteristics showed majority of women (99.5%) having no history of gestational diabetes in current pregnancy. Only few (4.1%) of the study participants had a history of gestational diabetes mellitus in past pregnancy. Majority of women (91.3%) have no history of gestational diabetes mellitus among family& relatives. A very few participants (2.6%) were already diabetic from before current pregnancy. Some (36.4%) participants also presented with a family history of diabetes.

With respect to obstetric variable, around half of the women were Multigravida (51.3%) with about 27.2% of women having history of abortion in the past. Around 16.4% of the study participants had other complications such as hypothyroidism, headache, high blood pressure, edema and pain abdomen in current pregnancy. Only 8.2% of women had such complications in past pregnancy.

Antenatal service-related variables showed that around 44.1% women were in 1st trimester, followed by 37.4% women in 2nd trimester and the rest 18.5% in their third trimester during the time of data collection. Majority (84.6%) of women had registered their pregnancy in 1st trimester. But most (64.1%) hadn't received any counselling regarding GDM during their antenatal visits. Those who received counselling regarding GDM, mainly (94.3%) received from field health workers.

Results showed that the major sources of information to the pregnant women regarding GDM were family and friends (34.9%), followed by health workers (23.6%). Doctors, hospital charts and posters combined comprised only 12.3% of source of information.

Awareness regarding GDM among pregnant women:

This study showed that about 3/4th (75.4%) of the study participants had poor awareness regarding GDM. Distribution of study participants according to the scores obtained are shown in Figure 2.





The median score obtained by the participants was 8 (IQR= 6-10). The awareness of the women on the various aspects of GDM is given in Table 1.

Factors associated with awareness regarding GDM:

Significant factors associated with poor awareness about GDM were Secondary education and below [AOR=3.48, 95%CI=1.63-7.42], absence of history of GDM among family& friends [AOR=7.24, 95% CI=2.12-24.66], less number of antenatal visits [AOR=3.48, 95% CI=1.63-7.42] and non-reception of

Items	Responses Correct N (%)
Awareness on Natural history of GDM	
Diabetes can present for the first time during pregnancy.	94(48.2)
Diabetes appearing in pregnancy disappears after birth of the baby.	35(17.9)
Awareness on risk factors of GDM	
Age >30yrs old	59(30.3)
Pre-pregnancy overweight/obese	83(42.6)
GDM in previous pregnancy	63(32.3)
Family history of diabetes	114(58.5)
Previous birth of overweight baby(≥4kg).	22(11.3)
Awareness on diagnosis of GDM	
Tests applied -as blood test after oral glucose load	80(41.0)
Women who need to be tested i.e. all pregnant women	144(73.8)
Awareness on treatment of GDM	
Carbohydrate restricted diet	135(69.2)
Oral antidiabetic drugs as treatment	31(15.9)
Insulin injection as treatment.	44(22.6)
Awareness on severity of GDM	
Can cause abortion	55(28.2)
Can result in low-birth weight baby	21(10.8)
Difficult labour	94(48.2)
Women have increased risk of developing diabetes in future.	45(23.1)
Awareness on behavioural factors which can prevent of GDM	•
Regular exercise	148(75.9)
Low intake of processed and high sugar content food	155(79.5)
Intake of lots of fruits and vegetables	181(92.8)
Awareness on preventive strategies of GDM	
Breastfeeding reduce future chance of developing high blood sugar.	37(19.0)

Table 1: Response of study participants on various aspects of Awareness Regarding GDM (N=195)

counselling during antenatal visits [AOR= 3.09, 95% CI =1.45–6.58].The multivariable regression model deduced was of good fit (non-significant Hosmer-Lemeshow test, P-value >0.05) while 24% to 32% of the variance of poor awareness regarding GDM could be explained by this model (Table 2).

Qualitative exploration of the perspectives of health workers with regard to gaps in proper

awareness generation activities about GDM among antenatal women

The KIIs revealed 2 major themes: (I) gaps in health system and (II) gaps among the beneficiaries. The major subthemes identified under the first theme were 'Health Personnel', 'Logistics' and 'Unavailability of services' (Figure 3).

Variables	Total N	Poor awareness n (%)	Unadjusted Odds ratio (95% CI)	p-value	Adjusted Odds Ratio (95% CI) [#]	p-value
			Age	•		
≤25yrs	118	95(80.5%)	1.98(1.02-3.84)	0.04	1.72(0.79-3.72)	0.16
>25yrs	77	52(67.5%)	1(Ref)		1(Ref)	
			Religion	-		-
Hindu	174	128(73.6%)	1(Ref)			
Muslim	21	19(90.5%)	3.41(0.76-15.23)	0.10		
		Educat	tional Qualification			
Higher secondary& above	81	50(61.7%)	1(Ref)		1(Ref)	
Secondary & below	114	97(85.1%)	3.53(1.78-7.00)	<.001	3.48(1.63-7.42)	0.001
		Occ	upational status			
Housewife	181	139(76.8%)	2.48(0.81-7.55)	0.10		
Employed	14	8(57.1%)	1(Ref)			
		Soci	o-economi status			
Upper Middle class & above	142	104(73.2%)	1(Ref)			
Below upper middle class	53	43(81.1%)	1.57(0.71-3.43)	0.25		
			Gravidity			
Primigravida	95	76(80.0%)	1.63(0.84-3.17)	0.14		
Multigravida	100	71(71.0%)	1(Ref)			
		H/0	abortion (n=100)			
Present	53	41(77.4%)	1(Ref)			
Absent	47	39(83.0%)	1.42(0.52-3.86)	0.48		
		H/O	Diabetes in family			
Yes	71	50(70.4%)	1(Ref)			
No	124	97(78.2%)	1.50(0.77-2.93)	0.22		
H/O Gestational Diabetes Mellitus among family & relatives						
Yes	17	5(29.5%)	1 (Ref)		1(Ref)	
No	178	142(79.8%)	9.46(3.13-28.59)	< 0.001	7.24(2.12-24.66)	0.002
Antenatal visits done till date of dat	ta collection(\downarrow) ^b		0.74(0.57-0.96)	0.027	3.48(1.63-7.42)	0.001
		Counse	eling regarding GDM	[
Received	70	41(58.6%)	1(Ref)			
Not received	125	106(84.8%)	3.94(1.99-7.80)	< 0.001	3.09(1.45-6.58)	0.003

Table 2: Factors associated with poor awareness about GDM among the study participants : Logistic Regression analysis (N=195)

*continuous variables

[#]variables which have come significant in the univariate model have only been included in the final

multivariable model (to estimate the adjusted odds ratio)

CI= Confidence Interval

Hosmer-Lemeshow test statistic=0.859, Cox and Snell's R²=0.241, and Nagelkerke's R²=0.321 :: 27 ::



Figure 3: Gaps in proper awareness generation regarding GDM

Under the 'Health Personnel' sub-theme, lack of periodic training of health workers on updates of GDM diagnosis and management and inadequate healthcare provider knowledge on GDM were the key gaps identified. Due to absence of standards, screening of women usually took place based on subjective judgement of providers In this context, H5 &H6 respectively reiterated:

"No guideline or protocol is there regarding GDM. If we find any woman with high sugar level, we advise her in similar way as we advise any other high risk (Hypertensive, preeclampsia) women"

"I don't feel the need of counselling every pregnant women regarding gestational diabetes. This would cause unnecessary tension and anxiety even among them who don't have raised sugar level"

The major gap identified among the 'logistics' sub-theme was the unavailability of the instruments like glucometer, lancets, strips & OGTT (Oral Glucose Tolerance Test) pouches. Even if some of them were available, they were in non-functioning state. H2 said in this regard:

"Glucometer has been given to us but once the battery became non-functional, it was not replaced. Since we have laboratory attached with our PHC, we also don't complain regarding that."

The two sub-themes mentioned above were in fact contributing to the next sub-theme identified i.e., 'Unavailability of services'. Absence/ inefficiency of resources, both manpower and material hampers proper delivery of services to the women visiting the antenatal clinics, thereby, missing an opportunity to generate awareness regarding this preventable complication of pregnancy.

Under the second theme, low literacy level of the mothers & exposure to limited source of information were the major gaps identified. Notable verbatim by H1 in this regard was:

"They don't understand GDM. Some of them who are educated enough, know about diabetes. But even they don't know the difference between GDM and other types of diabetes."

Discussion:

This mixed method study aimed to assess the awareness level regarding GDM among antenatal women attending health facilities in rural West Bengal and to explore the perspectives of health workers with regard to gaps in proper awareness generation activities. The findings revealed that 75.4% of study participants had poor awareness regarding GDM which is quite similar to the findings from other studies. A study done by Byakwaga et al.^[6] in Uganda,showed around 69% of women were not aware about GDM. Ogu et al.^[12] in Southern Nigeria, assessed awareness of GDM among women of reproductive age and not pregnant women as ours and found around73.8% of them had poor knowledge about GDM. On the contrary, a study done in Saudi Arabia^[13] and another done in Tamil Nadu, India,^[8] found only 33.8% participants and 25.8% had poor overall GDM knowledge score which shows that a lesser proportion of women were unaware of the disease.

Our study also showed secondary or below level of education to be significantly associated with poor awareness level of the study participants. This is quite similar to the findings by Lakshmi et al.^[14] where, participants with higher educational status were found to have a significantly higher mean knowledge score than their counterparts having lesser knowledge.

No history of Gestational Diabetes Mellitus among family and relatives showed significant association with poor awareness level in our study. This shows the level of impact that friends, family and relatives have in our society.

Lesser number of antenatal visits were also associated with poor awareness level in our study. This can be explained by the fact that with increasing number of ANC checkups, women are more likely to have had more chance of exposure to information on GDM from ANC clinics attended.

Our study also showed that those who didn't receive counselling regarding GDM during antenatal visits were more likely to have poor awareness level than their counterparts. It proves the importance of the vital role played by the field level health workers who are the first ones to attend the mothers in the antenatal clinics of sub centres and primary health centres.

The findings from the qualitative part of our study also strengthens our quantitative findings. It is the responsibility of the health system to organize awareness generation activities about such an important issue like GDM. But there were many lacunae in the health system itself that holds it back from executing its work effectively. Similar finding was obtained from studies done by Wotichaet al.^[15] in Ethiopia and Hinneh et al.^[16] in Africa, which also shows lack of standards and guidelines and inadequate on job training are among repeatedly mentioned obstacle related to screening and management of GDM. Present study also reveals that health facilities have shortage of supplies & consumables which prevents early detection and management of GDM. So, health system planners and leader-ship should consider fulfilling essential supplies for screening of GDM. Both the qualitative and quantitative part of our study had convergent findings which indicated that education has a strong impact on health literacy. This is congruent to the findings obtained by Carolan et al.^[17] in Australia. Pregnant women with higher education status are able to read health posters and have better understanding of the health information given to them by the health personnel during antenatal care. Educated women also have better access to mass media like internet which they can use to gain information and knowledge.

Conclusion:

This study reported a significant proportion (75.4%) of antenatal women having poor awareness regarding Gestational Diabetes Mellitus. Absence of counselling and low level of education were found to be significantly associated with poor awareness level. Therefore, there is need to improve health education programs both at the health centres and at the community level to empower patients with information regarding this grave issue.Women who have attained secondary education or less should be specifically targeted when giving health education sessions so as to increase their level of awareness on GDM. To improve this situation, health care

administrators and policymakers should also ensure that all pregnant women should at least have 4 antenatal visits accompanied by counseling regarding GDM at each visit, there is an adequate and timely supply of logistics and consumables to all health facilities starting from sub- centers and there is regular re-orientation training of all field-level health workers regarding diagnosis and management of GDM as per national guidelines.

Limitations of the Study:

This study was done as a cross-sectional interview, and hence the causal relationship between awareness regarding GDM and its predictors could not be determined. While most of the responses were recall-based, bias might be possible.

Declaration:

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Self-Medication Practices and Health Seeking Behaviour among Residents of Selected Villages in A Block of West Bengal: A Mixed-Methods Study

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Abstract:

Introduction: Self-medication can lead to problems such as adverse effects and antibiotic resistance. This study was conducted to estimate the proportion of self-medication practice, to elicit the reasons for practicing self-medication, to find the factors associated with self-medication practice and to assess the health seeking behaviour among a rural community of West Bengal. **Method:** A study with mixed-methods approach was conducted among 212 households from four selected villages in a block of West Bengal. Focussed Group Discussions were held with respondents who were practising self-medication. Data were analysed using SPSS 25.0 and Atlas ti 7.0. Multivariable logistic regression was performed to find the factors associated with self-medication practice. **Results:** The proportion of self-medication practice was found to be 41%. Allopathy was most commonly preferred system of Medicine (78.8%). Statistically significant factors associated with self-medication practice were education upto Middle school (aOR 3.59) and Secondary level (aOR 10.71), Class III socio-economic status (aOR 5.03) and presence of acute illness (aOR 28.92). **Conclusion:** Proportion of self-medication practice among rural population was high. This needs to be addressed and health education should be provided to them.

Keywords: Health Seeking Behaviour, Rural Population, Self-Medication, Village

Introduction:

Human beings have an inherent tendency to selftreat themselves at the first instance whenever they feel unwell. According to WHO, self-medication can be defined as "use of pharmaceutical or medicinal products by the consumer to treat self-recognized disorders or symptoms, the intermittent or continued use of a medication previously prescribed by a physician for chronic or recurring disease or symptom, or the use of medication recommended by lay sources or health workers not entitled to prescribe medicine".^[1] Due to lack of access to health care facilities many individuals opt to self-treat themselves at home using drugs which can be purchased in local shops without prescription.^[2] The spectrum of self-medication involves acquiring medicines without a prescription, that is Over-The-Counter (OTC) drugs, resubmitting old prescriptions to purchase medicines, sharing medicines with relatives or friends or using leftover medicines stored at home.^[3]

Health seeking behaviour is defined as "any action or inaction undertaken by individuals who perceive themselves to have a health problem or to be ill for the purpose of finding an appropriate remedy."^[4] In addition to Allopathy, India boasts of

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having six more recognized systems of Medicine namely Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy (AYUSH). The acceptance of a particular system of Medicine differs between urban and rural communities and depends upon their socio-cultural factors to large extent. In developing countries such as India, health problems are often treated through self-medication as lower cost method. Studies have reported prevalence of self-medication practice in India increasing from 31% in 1997 to 71% in 2011.^[5]

The internet is the first physician now-a-days for patients seeking health advice.^[6] In India, almost every pharmacy sells drugs without a prescription. Risks associated with self-medication include lack of clinical evaluation by a health care provider which could result in misdiagnosis and incorrect choice of drugs, delay in seeking appropriate treatments, use of excessive drugs or lower dosage, prolonged duration of use, adverse drug reactions and sometimes even masking of a severe disease.^[7] Another serious concern with self-medication practice is the risk of developing antimicrobial resistance (AMR).^[8] This is a major public health concern worldwide, especially in developing countries.^[9]

According to a study published in The Lancet, about 39 million people in India fall into poverty every year as a result of OOP expenditure on health care.^[10] In rural India, more than 80% of the hospital visits are made by people with majority travelling more than 100 kms just to receive basic health care services.^[11]

Compared to studies on health seeking behaviour, there is a paucity of studies on selfmedication practice especially among rural dwellers of West Bengal. Therefore, this study was conducted to estimate the proportion of self-medication practice, to elicit the reasons for practicing selfmedication, to find the factors associated with selfmedication practice and to assess the health seeking behaviour among a rural community of West Bengal.

Method:

A cross-sectional study was conducted using mixed-method approach in four selected villages of Budge Budge-II block, West Bengal from September 2020 to February 2021.

Study population:

The study population was the residents of the selected villages.

Quantitative: One individual from each household, preferably the head, was included.

Qualitative: Two Focused Group Discussions (FGDs) were held with individuals who reported practicing self-medication.

Individuals who did not give informed written consent to participate in the study were excluded.

Sample size and sampling technique:

Quantitative:

Taking proportion of self-medication practice p as 48.5% (0.485) from a study conducted at Anandnagar village in Singur block ^[5], q=1-p=0.515, Confidence Interval (C.I)=95% and absolute error L as 10%; sample size was calculated using Cochran's formula as follows:

 $N=(Z\alpha^2 pq)/(L)^2=[(1.96)^2 \times 0.485 \times 0.515]/(0.01)^2=96$

After multiplying by design effect of 2 for multistage sampling and adding 10% as nonresponse, total sample size was calculated to be 212. These 212 households were selected by multistage random sampling. (Figure 1)

Qualitative: Two FGDs were conducted with six participants in each selected by purposive sampling.

Study tools:

Quantitative: The study tool was a pre-designed, pre-tested structured schedule. The schedule was pre-tested among 20 randomly selected households for its validity and reliability. The residents who were selected for pre-testing were not included in the final study population.

Group	Group Drug	
NSAIDs	Paracetamol/ Ibuprofen/ Aceclofenac	44(20.7)
Anti-histaminics/ Anti-allergics Decongestant	Cetirizine, Levocetirizine, Montelukast, Chlorpheniramine, Phenylephrine	24(11.3)
Antacids, H ₂ blockers and Proton Pump Inhibitors (PPIs)	Pantoprazole, Ranitidine, Antacid gel (Digene)	21(9.9)
Laxatives	Ispaghula (Isabgol)	12(5.6)
Cough syrup	Cough syrup	11(5.2)
Antibiotics/Anti-protozoals	Azithromycin, Ofloxacin, Norfloxacin Metronidazole	6(2.8)

Table 1: Distribution of the study population according to the group of self-medicated drugs used (n=87)*

*Includes Multiple response

Qualitative: FGDs were conducted with help of guide which was validated by public health experts.

Study technique:

Quantitative: For data collection door-to-door visit of the selected households was done. At first, the head of the family was approached. If unavailable, then any other adult member giving consent was interviewed. If a resident of any household did not give consent, then the next selected household was approached. If any household was found locked on two consecutive days, then next household was approached. Data collection was done using face-toface interview method and all the responses were recorded in the schedule.

Qualitative: Two FGDs were conducted in the Rural Health and Training Centre. Each FGD lasted for about 20 minutes.

Study variables:

Quantitative:

Dependent variables: Self-medication practice and Health seeking behaviour

Independent variables: Socio-demographic and background characteristics, Co-morbidities or chronic illnesses (if any), Acute illness or any other health conditions in last 3 months (if any), Factors related to self-medication practice Qualitative: Four domains on self-medication were focused- awareness, pattern, reasons and perception

Operational definitions:

Self-medication: Practice of taking any form of medication for any type of illness without a doctor's prescription within last 3 months.

Health seeking behaviour: Refers to type of health care service and facility preferred by an individual to maintain, attain or regain good health and to prevent development of illness in future.

Data analysis:

Quantitative: All of the 212 households were included in analysis. Data was analyzed using SPSS version 25.0. Descriptive statistics were used to summarize the data. Bivariate analysis was performed to ascertain relationship between presence of self-medication practice and the sociodemographic characteristics. All independent variables having p-value<0.20 were considered biologically plausible to be included in the Multivariable binary logistic regression model. Data was checked for multicollinearity (VIF<10) and variables with p-value<0.05 were considered statistically significant.

Qualitative: Qualitative data was analyzed with help of Atlas ti 7.1 software in the form of themes, codes and verbatim.

Socio-demographic characteristics	Practice Self-medication (n=85)					
		β	S.E	AOR	95%C.I	p-value
	18-30	-0.608	0.975	0.544	(0.081-3.680)	0.533
Age group	31-45	-0.959	0.801	0.383	(0.080-1.842)	0.231
(in years)	46-60	0.336	0.735	1.399	(0.331-5.914)	0.648
	>60	-	-	1	-	-
Gender	Male	-0.568	1.292	0.566	(0.045-7.121)	0.660
	Female	-	-	1	-	-
Education	Non formal education	1.095	0.808	2.989	(0.614-14.553)	0.175
	Primary	1.280	0.728	3.597	(0.863-14.998)	0.079
	Middle	2.371	0.656	10.707	(2.960-38.727)	p<0.001
	Secondary	2.624	0.760	13.791	(3.109-61.166)	0.001
	Higher Secondary	-0.594	1.534	0.552	(0.027-11.162)	0.699
	Graduate	2.179	1.300	8.836	(0.692-112.870)	0.094
	Post Graduate	21.975	40192.97	-	-	1
	Illiterate	-	-	1	-	-
Occupation	Service	0.650	1.680	1.915	(0.071-51.559)	0.699
	Business	1.309	1.439	3.703	(0.221-62.096)	0.363
	Skilled job	0.524	1.463	1.689	(0.096-29.685)	0.720
	Unskilled job	2.028	1.348	7.602	(0.541-106.729)	0.132
	Retired	0.803	2.135	2.231	(0.034-146.478)	0.707
	Unemployed	21.508	17651.853	-	-	-
	Homemaker	-	-	1	-	-
Type of family	Joint	0.575	0.461	1.777	(0.720-4.385)	0.212
	Nuclear	-	-	-	-	-
Marital status	Widowed	0.214	0.886	1.239	(0.218-7.038)	0.809
	Unmarried	0.755	1.848	2.217	(0.057-79.56)	0.683
	Married	-	-	1	-	-
	Class II	0.280	1.158	1.323	(0.137-12.798)	0.809
Socio-economic	Class III	1.615	0.642	5.029	(1.429-17.695)	0.012
Class*	Class IV	0.914	0.544	2.493	(0.858-7.246)	0.093
	Class V	-	-	1		-
Acute illness in	Yes	3.365	0.537	28.924	(10.104-82.797)	p<0.001
last 3months	No	-	-	1	-	-
Constant		-4.835	1.016	0.089	-	-

Table 2:Multivariable binary logistic regression predicting Self-medication practice (n=212)

*Modified BG Prasad scale 2021 with CPI-1097 $^{\scriptscriptstyle [34]}$
Themes	Codes Verbatims		
	1. What is self- medication	"taking medicines on our own for common health problems without going to doctor."	
A. Awareness	2. Instructions on medicine	"Before using we see the expiry date." "don't read directions or instructions at the back of the medicine"	
	3. Dosage	"as these medicines are repeated, we know the dose and how to take"	
	4. Side effects	"headache, nausea, reeling of head" "stop when any side effects occur."	
	1. Name of medicine	"Paracetamol, Medicine for gas (acidity), cetirizine, cough syrup, vitamin tablet."	
	2. Source	"we keep common medicines at home." "Take the old prescription to the shop."	
B. Pattern	3. Illness	"for common problems like fever, headache, acidity, loose motion, cold and cough"	
	4. Duration	"stop when symptoms disappear" "Complete the full course as per old prescription"	
	1. Mild illness	"no need of going to doctor for mild illness." "Medicines for mild illnesses are there at home."	
	2. Health facility	"There is a long queue at rural hospital." "no one to take me there" "Hospital is far from my house."	
	3. Self-decision	"I know the medicine name so I take it by myself."	
C. Reasons	4. Daily wage loss	"Going to the hospital means loss of one day's work for me."	
	5. Government medi- cine does not work	"The medicines from Government supply don't work."	
	6. Emergency	"In emergency it is not possible to go the doctor, so we take medicine by our own."	
D. Perception	1. Good practice	"It is good only to take medicine if we know about it. In today's time one should know about common medicines."	
_	2. Bad practice	"Its is not good to take medicines without consulting doctor."	

Table 3: Thematic analysis from FGD-1 and FGD-2 (n=12)

Ethical Consideration:

Institutional Ethics Committee permission was obtained prior to start of the study (Institute name/IEC/2020/665 dated 06.02.2021). Informed written consent was obtained from each participant and all ethical principles were strictly adhered to throughout the course of the study.

Results:

About 35.8% of the study population belonged to 46-60 years age group. Proportion of males and females were nearly equal. Nearly 3/4th of the study population were Hindus (73.6%), about 78.8% belonged to General category as far as caste was considered and 84.9% were married. More than onethird of the study population (35.4%) was illiterate. Regarding occupation, about 46.7% were



Figure 1: Process of sampling technique (n=212)

Figure 2 A : Health seeking behaviour in Government Health Facilities (n=212)





Figure 2 B : Health seeking behaviour in Private health facilities

homemakers and 21.2% did unskilled work. About 56.1% of the study population belonged to joint families. A little over two-fifth belonged to lower class (Class V) as per Modified BG Prasad Scale 2021 (42.5%) with a median Per capital monthly income of Rs 1316.^[12] As far as addiction is concerned, about 43.4% had atleast one addiction most commonly being smoking.

More than half of the study population had atleast one co-morbidity (54.2%). Hypertension was the most common co-morbidity followed by Type 2 Diabetes Mellitus, Coronary Heart Disease and Prolapsed Intervertebral Disc (PIVD). About 52.9% individuals reported experiencing an episode of acute illness in the last three months. Rhinitis, fever, cough, knee/joint pain and fungal infection/scabies were commonly reported. COVID-19 infection was reported from 12 study subjects.

The prevalence of self-medication practice found in 87 households (41%). Most common source for procuring self-medication was nearby pharmacy shop (73.6%) followed by medicines stored at home (24.1%). Concerning frequency, about 34.4% practised self-medication sometimes. Most common group of drugs that were consumed were NSAIDS such as Paracetamol, Ibuprofen and Aceclofenac followed by anti-histaminics like Cetirizine. About 7% respondents admitted taking medicines without having any condition. Most commonly used were Multivitamins and B-complex capsules to prevent COVID-19 infection and stay healthy.(Table 1)

Table 2 showed Multivariable binary logistic regression determining predictors of self-medication practice. Predictors of self-medication practice were education upto Middle school (AOR 10.70, p<0.001) and Secondary level (AOR 13.79, p<0.001), Middle socio-economic status (AOR 5.02, p=0.012) and presence of acute illness within last three months (AOR 28.92, p<0.001).

Thematic analysis from the FGDs have been presented in table 3.The different themes (codes) that emerged were awareness (what is selfmedication, instructions on medicine, dosage, side effects), pattern (name of medicine, source, illness, duration), reasons (mild illness, health facility, selfdecision, daily wage loss, government medicine does not work, emergency) and perception (good practice, bad practice).

Regarding health seeking behaviour, more than $^{3/4^{\rm th}}$ of the study population preferred Allopathy

(78.8%) followed by medicines prescribed by Rural Medical Practitioners(12.3%) and Homeopathy (9.0%). When asked about the type of health care facility preferred, about 59.9% preferred Government, 18.9% preferred private health care facilities, 9% preferred Homeopathy clinics and rest (12.3%) preferred Rural Medical practitioners. Among those who preferred Government health care facilities, 86.6% preferred the nearby rural hospital while 3.9% preferred tertiary care hospital. (Figure2A&B)

Discussion:

Self-medication Practice

The proportion of self-medication practice in this study was found to be 41%. This is less than the finding from study conducted by Taklidar et al. in South Bengal (48.5%)^[5] by Ahmad et al. in Sahaswan town of North India (50%),^[13] study conducted by Kumar et al in the rural area of Chittoor District, Andhra Pradesh (51.75%),^[14] by Anandurai et al in Nelikuppam village in Kancheepuram district of Tamil Nadu(53.4%),^[15] 55% in rural area of Meghalaya by Maraket al.,^[16] 58.4% in another study in rural Tamil Nadu by Gayatri et al.,^[17] in rural areas of Pune, Maharashtra by Kecheet al. (64.3%),^[18] study by Rangariet al. a rural area of Andhra Pradesh (68.1%),^[19] by Balamurugan in Pondicherry (71%),^[11] inUttar Pradesh by Jain et al. $(72\%)^{[20]}$ and by Reddy et al.among village population of Kadapa town, Andhra Pradesh (74%).^[21]

In the present study, self-medication was most commonly used for common cold and cough which corroborated with the findings of studies by Nidagundi et al. conducted in rural area of Karnataka^[22] and Balamurugan and Ganesh in Puducherry,^[11] West Bengal study^[5] and North East study.^[16] Fever was the most common condition for practising self-medication in rural Maharashtra (39.4%),^[23] Kanchipuram town (39.8%)^[17] Nellikuppam village (55.8%) of Tamil Nadu,^[15] while headache was reported as most common in Uttar Pradesh,^[13] Vishakhapatnam^[19] and Bangalore.^[22] The most common self-medicating drugs were NSAIDS such as Paracetamol, Aceclofenac and Ibuprofen for problems like fever, headache and knee joint pain. This corroborated with the findings of most other studies which also reported rampant use of analgesics and antipyretics. However, it was in contrast to the findings by Limaye et al. in Tala areas of rural Maharashtra where most common group of self-medicated drugs were antacids and antibiotics.^[23]

Our study reported a higher prevalence of selfmedication practice among males than females (60.9%%) which was in line with most other studies but was in contrast with the findings from Hooghly study (57.5%),^[5] Chittoor study^[14] and Maharashtra study^[23] where females practised self-medication more. This may be due to the fact that most of the females in our study were homemakers and lacked access to over-the-counter drugs due to reasons such as social beliefs, customs, lack of autonomy and economic independence.

Self-medication was commonly used in the age group of 15-45 years. Amareswaraet al. also reported similar findings in a study conducted in rural Andhra Pradesh.^[24] Commonest source of procuring selfmedication was nearby medicine shop (73.6%). This was higher than the findings in the West Bengal study (59.3%)^[5] and Puducherry study (57.3%)^[11]

Common reasons reported for practising selfmedication were easy availability of medicines at nearby shop without prescription and perception that the illness is mild and there is no need of consulting a doctor. Similar findings were observed in the study conducted in Kancheepuram district^[15] and rural Karnataka^[22] which reported mild illness as the most common reason for self-medication practice. In addition, at Kancheepuram district, unavailability of doctors at the nearest health care facility was another leading cause for opting selfmedication.^[15]

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Health Seeking Behaviour

Present study showed that Allopathy was the most preferred system of Medicine (78.8%) which was similar to findings by Kumar et al. in Varanasi (77.9%)^[25] whereas in a study in rural Karnataka, a little over half of the study population preferred Allopathy (55.54%) followed by Ayurveda (33.4%).^[26] Sharma et al who conducted a study in Shimla reported that 81.4% of the respondents preferred Allopathy while 11.3% preferred the Ayurveda system.^[27]

This study reveals preference for government health care facilities (59.9%) over private health care facilities (18.9%). In rural Karnataka too, 48.15% of the study population preferred public health sector over private (31.29%).^[26] In Varanasi study, 74% of the respondents sought treatment from government hospitals followed by pharmacy (20.9%) and private practitioners (17.4%).^[25] Further, a study in a slum in Mumbai by Patil et al. showed 85.5% of the study population preferred government hospitals, while only 14% preferred private hospitals.^[28] High preference of government health care services has also been reported by Sachdev et al. in their study in Rajasthan and Aggarwal et al. in Dehradun district.^[29,30]

Present study showed that more than half (52.3%) of the study population were aware of various health insurance schemes. However, only 4.7% of the respondents had insurance coverage, out of which most (90%) had subscribed to government health insurance schemes. Netra et al. in their study at Davangere (Karnataka), reported higher (65.7%) level of awareness among the respondents, while 45.5% of them had insurance coverage, 90.5% of them being under government schemes.^[31] Further, Indumathi et al. in rural population of Bangalore district also brought out a high level (75.7%) of awareness on health insurance schemes, while 66.9% of them were existing subscribers.^[32] In another study by Bansal et al., in Fatehgarh, Uttar Pradesh among rural population, low levels (43.4%) of awareness were reported.^[33]

Strengths:

This was a rural community-based study with robust study designincluding mixed-methods approach.

Limitations:

There could have been a possibility of social desirability bias as some respondents might have given socially favourable responses. More numbers of FGD could have been given better understanding of reason behind self-medication. Also, an awareness intervention could have been better.

Conclusion:

There was a high proportion of self-medication practice among rural community dwellers and Allopathy was most commonly preferred system of Medicine. Factors associated with self-medication practice were education upto middle school and secondary level, middle socio-economic status and presence illness in last 3 months. Health education should be provided to them regarding the hazards of practising self-medication, irrational and inappropriate use of medicines and drug resistance. Public awareness along with enforcing and implementing laws about prescribed medications can reduce the rate of self-medication practice.

Declaration:

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Conflict of Interest: Nil

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Clients Perspective for Quality of Services at One of the Urban Primary Health Centres (U-PHC) at Municipal Corporation Area in One of the Cities of Western India

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Abstract:

Introduction: Client satisfaction surveys are central to quality improvement at health facility. It helps in identifying areas of low satisfaction and steps to maximize patient satisfaction. **Objectives:** To assess client satisfaction towards services at Out Patient Department (OPD) of at an U-PHC under Ahmedabad Municipal Corporation (AMC), identify areas of low satisfaction and suggest feasible remedial measures for improvement. **Method:** Out of 74 U PHCs under AMC, 1 was selected through simple random sampling. Quality of care was evaluated through client's feedback which was gathered through 10 check points (on structure, process and outcome) developed by state level quality team. Responses of 300 adult (> 18 years) subjects and their mean ± standard deviation scores were calculated. These subjects were selected consecutively as 25 cases (new cases who came first and were willing) on every 2nd and 4th Mondays for 6 months (Sep 2019 – Feb 2020). **Results:** While availability of drugs was perceived as very satisfying that of investigations was relatively an area of concern. Overall, only 1 client rated the services as average while all rest (99.6%) rated services as very good to excellent. **Conclusion:** Quality of services at this U PHC was good to excellent and had wider acceptability among its client.

Keywords: Client satisfaction, Quality evaluation, Urban Primary Health Centre (U-PHC)

Introduction:

Factors to avail urban health services through Urban Primary Health Centre (UPHC) are different from conventional rural PHCs in term of size, functions, focus on ambulatory care, limited staff/ infrastructure and the presence of more private providers.^[1] As per UN estimates by 2030, proportion of urban population in India will be 46%. Low awareness about the available services and a trust deficit in the public facilities are the common barriers. Quality care system should keep in mind the users of public health facilities to meet the expectations of patients/ beneficiaries and community at large and the services should remain accessible, affordable, dignified and user-friendly.^[2] Patient satisfaction, is a mean of evaluating the performance of a health facility. It is a proxy indicator to measure the success of doctors as well as the hospital.^[3] According to Donabedian's declaration for inclusion of patient's perception in quality assessment of care, healthcare managers incorporate patient centric care as a major component of healthcare mission.^[4] In view of this, present study was undertaken amongst the beneficiaries of OPD services of an U PHC under the AMC with the objectives to assess Client satisfaction level towards

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services available at OPD specially for routine medical services, case Registration and Reception, laboratory services and pharmacy. An additional objective was to identify areas of low satisfaction to suggest feasible remedial measures for improvement in current system.

Method:

Study area : Ahmedabad is the largest city of Gujarat, with a population of 57 lakhs (Census 2011)^[5] which is served by 74 U PHCs spread over in 7 administrative zones of AMC.^[6] Reference population & Study population : Adult patients (>18 years) attending Jodhpur U PHC for OPD services during OPD hours on all working days between Sep 2019 and Feb 2020 Sampling Technique and Selection of study subjects : Out of 74 U PHC under the AMC, 1 was selected through simple random sampling. Thus, U PHC Jodhpur located in South West Zone of AMC was selected. In order to ensure the representativeness, it was decided to collect the responses from 50 subjects per month 25 subjects on every 2^{nd} and 4^{th} Monday. In case if the pre-determined day had a public holiday, responses were collected on the next working day. Similarly, if there were less than 25 consenting subjects, remaining responses were collected on the next working day. Study subjects were selected serially among those who came first of all in the morning OPD at the registration counter.

Inclusion criteria : All adult (> 18 years) subjects reporting at the registration counter for some medical problem and who have not visited this facility in last 6 months for the same problem. Idea of including those who have visited within 6 months is to ensure only new cases and avoid including twice, those who have repeat visits. Only those who have come for their own consultations willing to participate were included.

Exclusion criteria : Those who are minor (< 18 years), did not give consent or have visited the facility earlier too within 6 months. People who

accompanied the patients or attendants were excluded.

Ethical issues : Since it was an evaluation of an ongoing national health program on a proforma designed by state government team^[7] therefore, ethical clearance was not required. However, permissions from state level in charge of quality control services and local authority in charge Medical Officer of concerned U PHC were obtained. Also, informed oral consent was taken from each subject who was assured of the confidentiality and also that his/her responses will not influence the treatment at this facility.

Data collection and analysis : Information was gathered from each subject regarding 10 checkpoints/ questions framed with relation of each area of care. Questions were asked in Hindi or Gujarati. Responses were gathered on Likert scale (ranging from 1 - 5 where 1 represent worst experience/ totally disagree and 5 represent the best experience or totally agree) Data was entered in excel sheet and tables were prepared. Qualitatively and quantitative data were analyzed as proportion and mean ± standard deviation.

Study tool : The study tool used, consists of 10 check points and is adopted from the manual from NUHM-NQAS.^[7] (Responses were gathered from 300 subjects and responses were interpreted as per the points/ scores assigned. So, after the interview of 300 subjects the responses as per the checklist were entered in an excel file. Here, every patient is asked to give points out of 5 for each check point. Following table shows interpretation of each point in context of their feedback.

Scoring Point	Interpretation			
1	Poor or totally dissatisfied			
2	Fair or somewhat dissatisfied			
3	Good or satisfied			
4	Very good or adequately satisfied			
5	Excellent or fully satisfied			

Results:

Study aims to assess the client satisfaction by soliciting the response through face-to-face interview method on 10 vital questions covering various aspects of OPD services of a UPHC. Assessment was done on a Likert visual analogue scale where the subject is asked to give his/ her score between 1 to 5. Healthcare quality comprises of 3 components – structure, process and outcome hence it was analyzed accordingly.

Structure:

Facility is spacious with adequate waiting area at different sub stations. By and large Clients were satisfied with the required information from registration counter to collection of drugs (4.7 + 0.5). Based on the perception of 298 (99.3%) clients, score was highest for availability of drug (4.9 + 0.4) followed by availability of sufficient information in the form of signages for ease of clients to access various services within the premises. Only 12 (4%) clients gave the score of 3 indicating good or satisfied, rest 288 (96%) gave score of 4 or 5 showing very good to adequately satisfied. While for availability of laboratory test and X ray within an U PHC, 154 (51.3%) scored 1 - 3 (3.4 ± 0.8) indicating very poor to somewhat dissatisfied or just satisfied. (Table 1)

Process:

Client's perception about the staff was very good, none of the client spoke bad or poor about them. Overall score for behavior of staff was 4.8 ± 0.5 indicating adequately/ fully satisfied. Except 4, all (98.6%) rated communication from doctors as very good to excellent. Here too barring 1, all clients were satisfied for time spent on consultation, examination and counseling with a score of 4 - 5 reflecting very good or excellent quality of care, accordingly, overall score was 4.9 ± 0.3 . In terms of waiting time till the point of care at various sub stations, mean score was 3.2 ± 0.7 . None of them gave score of 1 or 2 indicating that they had no serious issues with communication from doctors. For promptness at pharmacy counter,

254 (78%) rated between 1 and 3 with mean score 3.2 ± 0.6 , indicating that on this service was between very poor to average; only 66 (22%) rated it as very good to excellent.

Outcome:

In terms of outcome indicators, overall impression of the facility was very good to excellent as all clients except 1, rated overall services as 4 or 5 with a mean score of 4.9 ± 0.4 . It is surprising that except 2 clients, 298 (99.3%) rated this area as very good to excellent. Accordingly, the overall score was 4.8 ± 0.4 . For Cleanliness (OPD toilets, overall facility etc.) clients were fully satisfied and mean score was 4.8 to 4.9 with a standard deviation of 0.4. (Table 2)

Discussion:

Assessment of client satisfaction is crucial to ensure the quality services and client retention. Health administrators increasingly incorporate patient's perspective in determining a health care organization's competitive advantage and survival in terms of patient's satisfaction^[8,9,10,11] If monitored it is likely to increase compliance, greater patients' retention, ^[12, 13] and fewer malpractice suits. ^[14, 15] Inadequate availabilities of Primary Health Care and sub-optimal quality, is commonly responsible for the poor access to the Public Health facilities. Unlike most U PHCs in the city located in or around slums catering to either slum dwellers or those from low social class, this one is located in slightly posh area and caters also to urban middle-class segment with good acceptability. At times health facilities function in rented accommodation, which is not inadequate to deliver full range of services. Score as per Likert scale was highest for availability of drug which is great relief for catchment population largely daily wage earner or working unorganized sector. While visiting health facility and fear of losing earning of that day further impedes their access to the facilities. Barring few everyone was satisfied about the drugs. Those not satisfied maybe asking for the drugs prescribed

	Table	1. 500	i c uisu	ibutio	n as pe	chent	sperce	-puon	[II-300	J
Score Check point	Service provision Direction, Location & Department signage	Waiting time at registration Counter	Behavior & Attitude of staff of UPHC	Cleanliness of the OPD, toilets and overall facility	Attitude and communication of doctors	Time spent on Consultation, examination and counselling	Availability of laboratory test and x ray within UPHC	Promptness at Pharmacy counter	Availability of prescribed drugs at UPHC	Overall impression of the facility
1	0	2	0	0	0	0	8	0	0	0
2	0	23	0	0	0	0	16	20	0	0
3	12	205	10	2	4	1	130	214	2	1
4	71	52	51	63	50	21	134	53	40	36
5	217	18	239	235	246	278	12	13	258	263

Table 1. Score distribution as per client's perception (n=300)

Table 2: Scores	(Mean ±	Standard	deviation	for each	checklist)	(n=:	300)
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Variables	Mean ± Standard Deviation	
Structure	•	
Availability of sufficient information in Hospital (Direction, Location & Department signage etc.)	4.7 ± 0.5	
Availability of laboratory test and x ray within UPHC	3.4 ± 0.8	
Availability of prescribed drugs at UPHC	4.9 ± 0.4	
Process	•	
Waiting time at registration Counter	3.2 ± 0.7	
Behavior& Attitude of staff of UPHC	4.8 ± 0.5	
Attitude and communication of doctors	4.8 ± 0.4	
Time spent on Consultation, examination and counselling	4.9 ± 0.3	
Promptness at Pharmacy counter	3.2 ± 0.6	
Outcome		
Cleanliness of the OPD, toilets & overall facility	4.8 ± 0.4	
Overall impression of the facility	4.9 ± 0.4	

by their private doctors or in a definite combination which was not available here. Guiding Signages for at various points could make the clients satisfied which was better than study carried out by Kravtiz $^{\scriptscriptstyle [16]}$ as

only less than half signboards were present. Poor availability of investigations was the main reason for poor to average satisfaction (1-3) of half of clients. s This facility needs strengthening as routine investigations like Complete Blood Count, X ray etc. are being done outside this facility and clients have to come to collect the report next day or at times after 2 days or more. Strengthening of lab services and providing the reports of investigation on the same day is also essential for prompt treatment and also to reduce the Out-of-pocket Expenditure (OOPE) of patients. Client is more convinced of diagnosis if supported with the investigation, moreover record of such investigations can help to find out the prevailing endemic disease and can be helpful for surveillance and mapping of other health problems. Though structure is important component to quality, National Quality Framework is predominately relying on improving the outcome by us, gender and literacy level and the same determine the expectations too. Thanks to implementation optimizing the processes within given structural limitations. This is achieved by through assessment, improvement and standardization healthcare processes. However, desired outcome can only be achieved when optimal infrastructure/ human resources are utilized by efficient processes.

Absenteeism among the facility staff, inconvenient timing, poor availability of medicines, apathy, rude behavior of providers, week coordination among stakeholders, week referral linkage from community to U PHC or higher facilities are few other issues of prevailing Urban Health System. But in current study in spite of issues of manpower and overburdened staff it was good to hear very good or excellent from the clients (for service provided). It includes range of services from waiting period at different stations till collection of drugs. Similar response from clients was observed by another study where almost all participants expressed satisfaction with the behavior of doctors/ staff nurses,^[17] The most important motivating factor for the visit to the tertiary (48.2%) and secondary level (71.9%, 67.1%) of health facilities reported by Kumari R was the faith on doctors or health facility.^[18] Satisfaction at pharmacy counter was poor in present

study as only 1 person was engaged in registration as well as drug dispensing. Client satisfaction is a perception which depends upon age, socioeconomic status of Kayakalp and NQAS, cleanliness of facilities has improved tremendously. People from all walks of society avail this service for the reason of good quality of services.

Conclusion and Recommendations:

Overall, the quality of services at this U PHC has wider acceptability among its client base. While overall the services need to be sustained at the same level, laboratory services need strengthening. Staff at this center needs to be appreciated and incentivized (not necessarily financially). Putting an extra person whereby separate persons can do registration and dispensation of drugs, will take care of a major grievances of people. In order to get more understanding, these surveys should be done on regular basis along with few interviews of key informants (KI) and focal group discussion (FGD) of different stakeholders. These surveys on their own are not remedial but should be followed up by actions which should be cross checked in the next satisfaction survey. Lastly the findings and action taken and their impact (if any) must be reviewed by the authorities.

Limitations:

Survey done in a single U PHC which is otherwise also perceived as a better run facility cannot be considered as representative for all U PHCs of the city. Despite our best efforts to ensure the confidentiality of feedback, a courtesy bias on the part of subjects cannot be ruled out. Also, the Likert scale used here is not fully objective in assessment. Rush of clients in the OPD and also clients with repeat visits are also indicative of client satisfaction which have not been studied here. Sociodemographic details were not included as the tool was adopted from manual from NUHM-NQAS.

Declaration:

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Conflict of Interest: Nil

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Perceived Stress and Suicidal Ideation among the Farmers : A Cross Sectional Study from the Rural Field Practice Area of a Medical College in Karnataka Anjana R. Joshi¹, Dattatraya D. Bant²

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Abstract:

Introduction: Psychological Stress and other mental health problems are highly neglected in Indian farming Community. Changing climatic, weather and environmental conditions affected the growth of crops and yield. This has resulted in various stressful conditions faced by the farmers. The psychological stress leads to tensions in the family relationship, variations in their daily life, and poor operational decisions while farming and even may lead to farm accidents, suicides among them. **Objectives:** To study the Stress levels perceived by the farmers and the factors determining the stress among them and to study the suicidal ideation among farmers in the previous 6 months. Method: A Community based Cross sectional study was carried out in the villages of Kalghatagi taluk, among 324 marginal & small scale farmers of age group 18-60 years, using pretested semi-structured questionnaire comprising of socio-demographic details, occupational characteristics, perceived stress and the reasons for stress. The 4 item Perceived Stress Scale was used for the assessment of Stress levels. Higher Score indicates high levels of Stress. Results: Among 324 farmers, 69.8% of the farmers were males, majority of them belonged to 50-60 years, and most of them were small scale farmers. The mean perceived score was 6.29+4.38 SD. Majority of the farmers reported crop failure (35%) and debt (37%) as the reasons for stress. The major determinants of stress among farmers were crop failure, debt and family problems. Among 324 farmers 25.3% reported suicidal ideation in the previous 6 months. The Mean stress scores were high among those with suicidal ideation (12.69±1.12 SD). Conclusion: The study shows that stress levels were high among farmers and are related to the failure of crops, inability to pay the debts and other factors. The Mental health problems of the farmers should be addressed at early stages to reduce the burden of farmers' suicides. Primary mental health care should be made available to the rural population.

Keywords: Farmers, Mental health, Suicide

Introduction:

As per the 2011 census, 68.8% of India's population lives in rural areas. Two-thirds of the rural population depends on agriculture as their principal means of livelihood with the majority of them being small and marginal scale farmers.^[1]

Farmers are exposed to wide variety of climatic, weather, and environmental conditions. Changing climatic, weather and environmental conditions not only affects the growth of crops and yield but also has effect on health of the farmers.^[2] Farmers suffer from many occupational hazards, in addition to physical

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hazards; they also suffer from psychological hazards ranging from stress, depression, anxiety, to Suicidal tendencies and Suicides.^[2,3]

According to Flachs^[4] (2002) farming is one of the 10 most stressful occupations. The psychological stress leads to tensions in the family relationship, variations in their daily life, and poor operational decisions while farming and even may lead to farm accidents, suicides among them. It is important to effectively to recognize symptoms and management of the stressful event.

Psychological stressors among farmers^[2-5]

Farm-related factors : The weather and Rain, Drought and floods, Problems with machinery, livestock and crops, Government export policy, Farm accidents and injuries ,Balancing roles as a family member and farmer

Financial factors : Market prices for the crops/livestock, Taxes, Health care costs, High debt load, not enough money for day-to-day expenses, working with bankers and loan officers, Government farm price supports

Family and Social factors : Not enough time for family, Cost of health care, Distance from doctors or hospitals, Limited social interaction, Debt because of marriage in the family

These stressors affect the mental wellbeing of the farmers resulting in lack of concentration resulting in accidents, poor general well being, and lack of job satisfaction, suicidal tendencies.^[3]

As per National crime record bureau, 2020, farmer's suicides (10,677) accounted for 7.0% Of total suicide victims.^[6]

Farmer's perception about mental health issues is like while working in the farm stress is common and they cannot avoid these and they should be handle all these situations on their own. Mental Health care seeking among farmers is poor with negative attitude towards its diagnosis and management.^[3,5] Mental illness and psychological illness are often linked to unfortunate fate, wrath of god, and witchcraft especially in rural India. This leads to delay and deny in seeking care and treatment resulting in increase in suffering and decreased quality of life, Suicidal ideation and suicides.^[7,8]

As the mental health problems, stress was least studied among the farmers, the present study helps in assessing the stressful conditions perceived by them and also the reasons for the stress.

Objectives:

- 1. To study the Stress levels perceived by the farmers.
- 2. To study the factors determining the stress levels.
- 3. To study the suicidal Ideation in the previous 6 months.

Method:

A community based cross sectional study was conducted among the marginal and small scale farmers aged 18-60 years residing in the field practice area of KIMS, Hubli during 2018-2019. Pregnant and lactating women and farmers with debilitating illness were excluded from the study. Total 12 Villages were selected using cluster sampling and study participants were selected using Systematic random sampling. Informed written consent was taken from the study participants. The study was approved by Institutional ethics committee, KIMS, Hubli. The present study was a part of major study.

Sample size: The sample size was calculated by reviewing the previous study among the farmers in Deepak Justine Viswanathan,^[9] the suicidal ideation was reported by 60% of the farmers, with 95% confidence limits and 8% of allowable error; the sample size was calculated using the formula; $n=\frac{1.96^2pq}{l^2}$ Assuming the design effect of 2 and 10% non response rate, the sample size of 324 was used for the study.

The predesigned semi structured piloted questionnaire consisting of socio-demographic

details, occupational characteristics and the perceived stress in the previous month and also Suicidal Ideation in the previous 6months was used for the data collection. House to House Survey was done; farmers were interviewed after obtaining the written consent in the regional language. For assessing Socio-economic classification Modified BG Prasad's Socio-economic classification for the year 2019^[10] was used (Consumer Price Index during 2019: 307)

Perceived stress Scale 4 item ^[11, 12]**:** The Perceived Stress Scale (PSS) was developed by Cohen, Kamarck and Mermelstein to assess "the degree situations in one's life appraised as stressful". This questionnaire was designed to assess "the degree to which respondents found their life unpredictable, uncontrollable, and overloading"

Scoring : 5 point likert scale, for Item 1 and 4, 0-Never, 1-Almost never, 2-sometimes,3-fairly often,4 -very often ; Item 2 and 3: 4 = Never, 3 - Almost Never, 2 - Sometimes, 1 -Fairly Often, 0-very often; Lowest Score:0 and Highest Score: 16; Higher Score signifies high levels of Stress.

Data analysis : The data was entered in MS Excel and analyzed using SPSS v21, Suitable descriptive and inferential statistics were used for the study. Independent t test and ANOVA were used to assess the association between stress levels and factors determining stress. P level <0.05 is considered as significant.

Terms used in the study:

• **Farming/ Agriculture** : In the fourth report of the joint ILO/WHO Committee on occupational health, agriculture was taken as all forms of activities connected with growing, harvesting and primary processing of all types of crops, with breeding, raising and caring of animals and with nurturing the gardens and nurseries. "Farmer/ Agricultural worker means any person engaged either permanently or temporarily, in activities related to agriculture

as defined above, irrespective of his/her legal status."^[13] In India, Ministry of Labor includes ploughing, sowing, weeding, transplanting, harvesting, cultivation, forestry, plantation, fisheries, and others as principal agricultural operation.^[14]

- **Agricultural laborer**^[15]: Agricultural laborer means any person employed in agricultural crop production as a wage earner, whether in cash or kind, for his livelihood and includes a person engaged through a contractor or engaged as a self employed person.
- **Marginal scale farmer**^[15]: Agricultural worker owning a land of less than 1.00 hectare (2.471~2.5 acres)
- Small scale farmer^[15]: agricultural worker owning a land of 1.00-2.00 hectares [(2.471-4.941) ~ (2.5 to 5 acres)].

Results:

Socio-demographic details :

Majority of the farmer (69.8%) were males and 30.2% were females. Most of the farmers (39.8%) were in the age group of 50-60 years, only 11.1% of the farmers were in the age group of 18-30years, about 45.1% of the farmers were literates. Majority of the farmers (67%) belonged to lower middle class, 16.7% and 16.4% belonged to middle class and lower class according to modified BG Prasad SES classification respectively. Out of 324 farmers 51.2% of the farmers were small scale farmers, followed by marginal farmers (38.9%) and agricultural laborer (9.9%).

Perceived Stress and factors determining the stress:

Perceived Stress was assessed using 4 item Perceived stress Scale, the higher score indicates the higher levels of Stress. Mean perceived score reported was 6.29±4.38 SD, About 2.8% and 15.4% of the farmers felt that they were unable to control important things in their lives in the previous month

Variables	Never	Almost never	Sometimes	Fairly often	Very often
Unable to control the important things in the life(ITEM 1)	78 (24.1%)	117(36.1%)	70(21.6%)	50(15.4%)	9(2.8%)
Difficulties were piling up so high that the individual could not overcome them (ITEM 4)	63(19.4%)	77(23.8%)	73(22.5%)	48(14.8%)	63(19.4%)
Variables	Very often	Fairly often	Sometimes	Almost never	Never
Confident about the ability to handle personal problems (ITEM 2)	106(32.7%)	92(28.4%)	24(7.4%)	26(8.0%)	76(23.5%)
Felt that things were going in their way (ITEM 3)	69(21.3%)	119(36.7%)	79(24.4%)	49(15.1%)	8(2.5%)

Table 1: Description of the Items of Perceived Stress Scale (perceived in the previous month)





very often and fairly often respectively and about 19.4% and 14.8% of the farmers felt that the difficulties were piling up that they could not overcome them very often and fairly often respectively, 23.5% of the farmers never felt that they were confident about the ability to handle personal problems in the previous month. About 15.1 % and 2.5% of the farmers never felt that the things in their life were going in their way. (Table 1) The reliability analysis of PSS 4 in the present study was good with Cronbach's alpha of 0.867.

Reasons for stress :

Out of 324 farmers interviewed majority of the farmers reported debt (37%) and crop failure (35.5%) as the reasons of stress. (Figure 1) There was a significant difference among the stress levels and socio-economic status, the stress scores were high among farmers belonging to lower class when compared to the lower middle class and middle class(P <0.05), the stress levels were significantly associated with the age, as age advanced, the stress

Variables	ariables Total Stress Score		Mean ± Std. Deviation	t /F#	p Value
Condon	Male	226(69.8%)	6.11± 4.32	1 1 5 0	0.249
Gender	Female	98(30.2%)	6.75±4.51	-1.130	0.240
Socio-	Middle	54(16.7%)	5.74± 3.64		
Economic	Lower Middle	217(67.0%)	5.86±4.57	9.402	0.0001*
Status	Lower	53(16.4%)	8.62± 3.50		
	18-30years	36(11.1%)	4.58±3.44		
Але	30-40years	81(25.0%)	5.75±3.76	2 207	0.019*
Age	40-50 years $78(24.1\%)$ 6.55 ± 4.92 5.		5.597	0.010	
	50-60years	129(39.8%)	6.96± 4.51		
	Small Scale Farmer	32(9.9%)	7.2±4.8		
Land Owning	Marginal Farmer	126(38.9%)	6.3±4.2	0.841	0.432
	Agricultural Laborer	166(51.2%)	6.1±4.4		
	Married	289(89.2%)	6.29±4.35		
Marital Status	Unmarried	20(6.2%)	4.30±4.01	5.048	0.007*
	Widowed/Divorced	15(4.6%)	9.00±4.29		

[#]Independent t- test and ANOVA were used, *p value<0.05 : Significant

Table 3: Association between the Percei	ived Stress Scores and reasons for stress
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Total stress score		n (%) Mean ± Std. Deviation		Indepe- ndent t- test	p value
Crop	Yes	115(35.5%)	7.24 ± 4.89	2 7 2 7	0.007*
failure	No	209(64.5%)	5.78±3.99	2.727	0.007
Doht	Yes	120(37.0%)	7.12±4.56	2 5 7 0	0.011*
Debt	No	204(63.0%)	5.81± 4.21	2.579	
Family	Yes	99(30.6%)	6.42±4.28	0.240	0.728
problems	No	225(69.4%)	6.24± 4.44	0.340	
Workload	Yes	103(31.8%)	6.43±4.62	0.266	0.714
workioad	No	221(68.2%)	6.23±4.27	0.300	
Illness	Yes	79(24.4%)	6.0±4.52	0.600	0.401
	No	245(75.6%)	6.39±4.34	-0.090	0.491

Independent t- test was done * p<0.05: Significant

Total stress score		n (%)	Mean ± Std. Deviation	Indepe- ndent t- test	p value	
Crop	Yes	115(35.5%)	7.24 ± 4.89	2 7 2 7	0.007*	
failure	No	209(64.5%)	5.78±3.99	2.727	0.007*	
Daht	Yes	120(37.0%)	7.12±4.56	2 5 7 0	0.011*	
Debt	No	204(63.0%)	5.81± 4.21	2.579	0.011	
Family	Yes	99(30.6%)	6.42±4.28	0.240	0.728	
problems	No	225(69.4%)	6.24± 4.44	0.348		
	Yes	103(31.8%)	6.43±4.62	0.266	0.71.4	
workload	No	221(68.2%)	6.23±4.27	0.300	0.714	
Illness	Yes	79(24.4%)	6.0±4.52	0.000	0.401	
	No	245(75.6%)	6.39±4.34	-0.690	0.491	

Table 4: Association between Suicidal Ideation and the reasons for stress

Independent t- test was done * p<0.05: Significant

levels were high. (Table 2) Stress levels were high among widowed or divorced farmers when compared to married and unmarried farmers.

When Post Hoc tests were conducted the stress scores were high among the farmers belonging to Lower class, and among 50-60 years age group when compared to age group of 18-30 years (p<0.05). The mean stress scores were significantly high among those farmers who reported crop failure and debt in the previous year (p<0.05). (Table 3) Mean Scores were also high among those farmers with family problems and increased workload.

Suicidal Ideation:

Among 324 farmers 25.3% reported suicidal ideation in the previous 6 months. Suicidal ideation was associated with Crop failure and debt (Table 4). The Mean stress scores were high among those with suicidal ideation ($12.69\pm1.12SD$) when compared with those without suicidal ideation ($4.14\pm2.5SD$) in previous 6 months with t value of -41.47 and p value of < 0.0001.

Discussion:

In India, mental health is not given much importance, especially rural farmers, it's a neglected entity. The mental health problems are least studied. In spite of increase in suicides among farmers, early diagnosis and proper management of mental health problems is still not possible.

In a study conducted by Priyanka Bomble ^[8] in Maharashtra about half of the farmers reported mental ill health in the previous 2 weeks. In the present study among 324 farmers 25.3% reported suicidal ideation in the previous 6 months. Suicidal ideation was associated with Crop failure, debt and age of the farmers. Where as in a study conducted by Deepak Justine Viswanathan^[9] in Tamil Nadu, showed higher percentage of suicidal ideation(60.3%). In the present study suicidal ideation was high among older age group (50-60years) which is in contrast to the study by Deepak Justine, which showed among younger age group.

In the present study major determinants for stress were debt, crop failure, and socio-economic stress. In a study conducted by Gregory D. Kearney^[5] in North Carolina, majority of the farmers reported as concern about the weather (60.2%), concern over the future of the farm (29.7%), market prices for crops/livestock (45.3%), taxes (38.3%), health care costs (32.5%), were Very stressful.

In the present study the stress scores were high among the farmers with low socio-economic status,

advanced age, and widowed/divorced farmers, which indicate that for the psychological wellbeing of the person is dependent on socio-economic and familial factors.

As per NCRB report 2014^[16] on farmers suicides the most common reasons for suicides was Bankruptcy or Indebtedness(21.5%) and Family Problems'(20%), Farming Related Issues(21.4%). In the present study the most common reason for suicidal ideation was crop failure (29.8%) and debt (33.1%).

Conclusion:

Farmers perceive significant levels of stress with the main reasons for stress being crop failure, debt, and workload. Stress levels were high among older farmers, and those belonging to lower socioeconomic status. Suicidal Ideation is common among farmers. There is a need to provide primary mental health care to the rural population. The government should support the farmers by providing economical support for them.

Recommendations:

Primary Mental health care centers with the facilities for diagnosis, management and counseling services for mental illness should be provided at the Village level or taluk level. Community awareness about mental illness and early help seeking behavior minimizes the burden and also suicidal ideation and suicides.

Declaration:

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Conflict of Interest: Nil

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Knowledge, Attitude and Practice of Family Planning Methods among Women of Reproductive Age Group attending Primary Health Centres in North-East India Chelsia Chelladurai¹, Avinash Keisam², Jangkholun Touthang¹

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Abstract:

Introduction: Warranting access to modern family planning methods constitutes a basic human right and globally around 270 million women of reproductive age group have an unmet need for contraception. **Objective :** To estimate the knowledge, misconceptions and practices related to family planning methods among women of reproductive age group attending primary health centre. Method: A cross-sectional hospital-based study was conducted in four health centers from January to February 2019 among women of reproductive age group (15-49 years). Data regarding socio-demographic characteristics, knowledge, attitude and practices pertaining to family planning methods were collected using a pre-tested interview schedule. Descriptive and analytical statistical analyses like mean, proportions, Chi-square and Multivariable logistic regression were conducted. A p value of less than 0.05 was considered statistically significant. **Results:** In this study 348 women were enrolled, of which 39.4% had adequate knowledge regarding family planning methods. Most participants had a healthy attitude towards the use of family planning methods and considered them beneficial whereas 59% stated their religious faith and cultural beliefs restricted the use of contraceptives. Unmet need of contraceptives was 60.2% while 39.8% used any one of the modern contraceptive methods. Lower age (AOR-1.26), Primi-parous (AOR-2.76) and women having a lower monthly income (AOR-2.51) were more likely to have an unmet need of contraception. **Conclusion:** Despite easy accessibility and low cost of the contraceptives, their use was limited. The high proportion of unmet needs mandates the scaling up of activities to increase the awareness regarding modern contraceptives. Additionally, behavioral change communication strategies are in great need for implementation to counter the negative attitudes pertaining to family planning practices.

Keywords: Attitude, Family planning, Knowledge, Misconceptions, Unmet need

Introduction:

Access to contraceptive methods and information regarding contraception is a basic human right for every woman in her reproductive age group. Globally, out of 1.9 billion women in their reproductive age group, 270 million women still have an unmet need for contraception. Accessibility to contraception and information regarding the same is centre to a woman's freedom to choice, dignity, bodily autonomy and gender equality.^[1-3] Promoting family planning practices safeguards the health of the mother as well as the child. Contraceptives prevent unwanted pregnancies and thus reduce unsafe abortion which is detrimental to the health of the

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woman.^[4] Ultimately, they enable in reducing adolescent pregnancies and also has a long term benefit of slowing the population growth, especially in developing countries. Evidences suggest that infant mortality rate is 45% higher when the birth spacing is less than two years and 60% higher than the births which are spaced for four years and above.^[1,5-7]

Globally, female sterilization is the most common method of contraceptive used followed by male condom whereas in eastern and south eastern Asia, majority of women rely on intrauterine devices (18.6%) and male condom (17%).^[3,8]

Historically, India was the first country in the world to launch a National programme for family planning in 1952. Over the decades, the programme has undergone drastic transformations pertaining to its policies and programme implementation strategies. This has ultimately resulted in the steep decline of Crude birth rates and Total Fertility rate of the country.^[9-10] However, nationally, the prevalence of modern contraceptive usage is only 52.2%. There is vast heterogeneity in the prevalence wherein at one end of the spectrum states like Manipur had as low as 18.2% whereas at the other end of the spectrum, Andhra Pradesh has a prevalence of 70.8 %.^[11-14]

After extensive literature search it was evident that there was a dearth of published literature which estimated the knowledge, attitude and practices pertaining to family planning methods in Manipur. Thus, acknowledging the putative need, this study was taken up to assess the met and unmet needs of family planning methods among women of reproductive age group and also estimated their knowledge and attitude in a socio-cultural context.

Method:

A hospital-based cross-sectional study was carried out from January to February 2019 in four health centres in Imphal East and West, Manipur. The study participants were women of reproductive age group attending these health centres. Universal sampling was done wherein all the eligible women attending the health centres and consenting to participate in the study were enrolled as study participants. Using a 15.6% of unmet need, an absolute error of 4% with a 95% significant level, the sample size was estimated to be 320 women.^[11]

Instrument and data collection

Data collection was done from women attending four Primary Health Centres using a pre-tested interview schedule which included three sections. The first section included the socio-demographic profile including the history of current and previous pregnancy. The consecutive sections assessed the knowledge, attitudes and practices regarding family planning methods.

Operational definition

Participants were assessed using a total of 22 questions. Those who scored only up-to 50th percentile were considered having inadequate knowledge whereas those who scored more than the 50th percentile score were considered to have adequate knowledge regarding family planning methods.

Statistical analysis

The data were entered into MS Excel spreadsheet and analyzed using IBM SPSS Version 22 (Customer ID: 224116). Descriptive statistics such as mean, median and percentages were used to describe the data. Risk ratio for unmet need of contraception was estimated using Multivariable Logistic regression. A p value of <0.05 was considered statistically significant.

Ethical approval was obtained from the institutional ethics committee of the State medical college and written informed consent was taken from each participant before the start of the interview.

Results:

A total of 348 women were included in the study. Respondents had a mean age of 27 (±5.5) years

Variables	Categories	n (%)
Age group	18-24	92 (26.4)
Age group	25-29	141 (40.5)
(years)	30 and above	115 (33.1)
Desidence	Urban	50 (14.4)
Residence	Rural	298 (85.6)
Manital status	Married	339 (97.4)
Marital status	Unmarried	9 (2.6)
Parity	Primi	120 (38.5)
Tarity	Multi	192 (61.5)
Manthla	<10,000	104 (29.9)
income (Rs)	10,000-20,000	191 (54.9)
meenie (no)	>20,000	53 (15.2)
	Hindu	178 (51.1)
Religion	Christian	3 (0.9)
	Islam	167 (48)
Occupation of	Home maker	270 (77.6)
respondent	Working	78 (22.4)
Occupation of	Employed	295 (87)
husband (n=339)	Unemployed	44 (13)
	Illiterate	37 (10.6)
Educational level	Primary	190 (54.6)
of respondent	Secondary	94 (27)
	Graduate	27 (7.8)
	Illiterate	25 (7.4)
Educational level of	Primary	99 (29.2)
husband (n=339)	Secondary	155 (45.7)
	Graduate	60 (17.7)
	Respondent alone	3 (1.9)
Decision making	Husband alone	38 (24.4)
contraceptive	Both	114(73.1)
usage*(n=156)	Others (Mother in law or father in law)	6 (3.8)

Table 1: Socio-demographic characteristics of study participants (N=348)

*Multiple response type

where a majority of them were 25 years and above. The mean age at marriage of respondents was 21.3 (± 3.86) years and women had their first child as early as 17 years wherein on average most women had their first child at 22.4 (± 3.79) years.

planning methods (N=348)					
Family planning methods	n (%)				
Oral contraceptive pills as a method of contraception	234 (67.2)				
Types of OCPs	88 (25.3)				
Correct use of pills	47 (13.5)				
IUDs as a method of contraception	158 (45.4)				
Types of IUD	51 (14.7)				
Tubectomy as a method of contraception	61 (17.5)				
Vasectomy as a method of contraception	41 (11.8)				
Condom as a method of contraception	311 (89.4)				
Availability of condoms for free of cost at health centres	195 (56)				
Lactational amenorrhoea method	255 (73.3)				
Availability of injectable contraceptives	18 (5.2)				
Use of progesterone only pills during postpartum period	32 (9.2)				

Table 2 : Knowledge regarding modern familyplanning methods (N=348)

Only 39.4% of the women had adequate knowledge regarding modern family planning methods whereas the rest 60.6% had inadequate knowledge. Although women were aware of Oral Contraceptive Pills (OCP_s) as a method of contraception, almost all the women had no knowledge regarding the side effects of Oral Contraceptive Pills (OCP.) whilst only 5% had correct knowledge regarding their indications and contraindications. Despite being aware of IUDs, most women (68.1%) were unaware of where to access for IUD insertion and whom to approach. Majority of women (74%) were unaware that IUDs are provided free of cost in any government health centre. Apart from modern contraceptive methods half of respondents were well aware of traditional methods of contraception like calendar and withdrawal methods.

Statements	Agree n (%)	Disagree n (%)	No comment n (%)
Religion or cultural beliefs prevent me from using family planning services	204 (59)	109 (31)	35 (10)
Family planning services are beneficial	295 (85)	11 (3)	42 (12)
I will advise my friends and family to use family planning	286 (83)	8 (2)	52 (15)
Spacing will allow a child to be healthier and for that I need family planning services	316 (91)	4 (1)	28 (8)
Family planning services benefit both men and women	282 (81)	8 (2)	58 (17)
Discussion about family planning with spouse is embarrassing	69 (20)	196 (57)	80 (23)
Family planning services can protect health of family and community	273 (78)	9 (3)	66 (19)
I will accept family planning services from nearest health centre	265 (76)	19 (6)	64 (18)
When I am unable to get pregnant, family planning services will benefit me	247 (71)	7 (2)	94 (27)

Table 3: Attitudes regarding family planning

Table 4: Practice regarding contraceptivemethods by respondents

Practice	n (%)
Unmet need of contraceptives (N=339)	204 (60.2)
Ever used any contraceptive	156 (44.8)
Contraceptives currently used	l (n=135)
Condom	73 (54.1)
ОСР	32 (23.7)
IUD	30 (22.2)
Place of accessing condom	(n=73)
Govt health centre	45 (61.6)
Pharmacy	22 (30.1)
Other shops	6 (8.3)
Place of accessing OCP (n	=32)
Health centre	11 (34.4)
Pharmacy	21 (65.5)
Place of insertion of IUD (n=30)
Govt. health centre	27 (90)
Private hospital	3 (10)

Source of information regarding family planning methods:

Media (60.6%) and health care workers (43.7%) were reported as the primary source of information regarding contraceptives. About 21% gained awareness from their friends whilst in 16.7% of the respondents their relatives were their source of information.

Practice of family planning methods :

Only 39.8% of the women had their contraceptive needs met whereas a majority of them (60.2%) had unmet need of modern family planning methods. About 5.2% of the women reported having an unplanned pregnancy. Only 34.4% accessed OCPs from the health centres although they were available at a subsidized cost and despite condoms being distributed free of cost at health centres, still 38.4% of them preferred purchasing it. The key reasons for unmet need of contraceptives were either due to method-specific barriers like fear of perceived side effects (33.5%), lack of familiarity (30.5%), disapproval by their family members (23.6%) or restriction of its use by their religion (10.1%). A small proportion of them had an unmet need due to the high cost of contraceptives (2.3%).

	Unadjusted		Adjusted		
	Odds ratio (95% CI)	p value	Odds ratio (95% CI)	p value	
Age (years)					
18-24	2.66 (1.47 to 4.81)	0.001	1.26 (1.12 to 2.57)	0.003	
25-29	1.92 (1.16 to 3.17)		1.61 (1.13 to 2.77)		
30 and above	Ref		Ref		
Parity					
Primi	2.75 (1.68 to 4.48)	<0.001	2.76 (1.61 to 4.74)	<0.001	
Multi	Ref		Ref		
Occupation of					
woman				_	
Home maker	1.21 (0.72 to 2.01)	0.46	Not retained		
Employed	Ref				
Literacy level	1 02 (0 E1 to 2 07)	0.02			
liliterate	1.05 (0.51 to 2.07) Ref	0.92	Not retained	-	
Kesidence	$1.40(0.77 \pm 0.06)$	0.22	Notratainad	-	
Bural	1.40 (0.77 to 2.00) Ref	0.25	Not retained		
Income (rupees)					
<10,000	2.05 (1.04 to 4.05)	0.03	1.75 (1.21 to 3.70)	0.02	
10,000-20,000	2.23 (1.26 to 4.37)		2.51 (1.28 to 4.89)		
>20,000	Ref		Ref		
Knowledge					
regarding					
contraceptives					
Inadequate	1.35 (0.86 to 2.10)	0.18	Not retained	-	
Adequate	Ref				

 Table 5: Multivariable logistic regression analysis of Unmet need of contraception with selected socio-demographic variables

Variables with p<0.05 entered into multivariable regression model. Nagelkerke R square-0.11

Majority of women relied on condom as mode of contraception due to its easy availability and personal preference whereas some of them reported their use due to their partner's preference. Some reported the use of OCPs or condoms as the use of terminal methods of contraception was forbidden in their communities. Almost a quarter of women reported to prefer IUD use due to its long-term protection, personal preference and perceived higher effectiveness in preventing pregnancy.

Discussion:

Unmet need for family planning is a universal indicator to measure a country's progress towards achieving universal access to reproductive health. Data on the prevalence of contraceptive use supplements the unmet need wherein both together make up the demand for family planning services.

In the current study, despite the higher literacy status, knowledge regarding modern contraceptives

was adequate in only 39.4%. This low level of awareness regarding family planning methods necessitates a structured and coordinated response by providing comprehensive education on modern contraceptives which is respectful and also free of stigma and discrimination. Furthermore, access to correct information regarding contraceptive methods safeguards women from unintended pregnancies, guaranteeing a healthier future.

Women had better awareness regarding the use, side effects and additional benefits of contraceptives like condoms, IUD and OCPs whereas knowledge regarding permanent methods of sterilization was almost nil. These findings also corroborated with studies conducted in other parts of Northeastern India and also mainland India.^[16,17]

Most women in our study lacked autonomy in decision making regarding the usage of contraceptives wherein the most of the decision making regarding contraceptive use was by their partners, in-laws and other family members which is in contradiction to the objectives of reproductive health where every woman has the right to decide the use of contraceptives, spacing and timing of her children. Thus, health care providers and health systems need to empower women in making decisions best suited to their reproductive intentions.

Unhealthy attitudes and method-specific barriers regarding family planning practices should be effectively countered with behavior change communication (BCC) strategies with the aid of mass media. Evidence suggest BCC strategies have significantly improved the contraceptive usage and intention to use family planning methods.^[18,19]

Usage of modern contraceptive methods in our study was as low as 39.8% and studies conducted elsewhere in India, the use of modern contraceptives was analogous to findings reported in our study.^[20] To bridge this gap between met and unmet needs, health care workers need to be adequately trained and equipped to provide quality information and guidance on contraceptive use. Moreover, approaches to improve the counseling and communication skills of the health care workers need to be enhanced to deliver high-quality family planning services.^[21]

In Manipur, a total of 12.7% of them had an unmet need for contraceptives whereas 4.7% had unmet need for spacing methods. About 61.3% reported to currently use any method of contraception whilst only 18.2% used modern contraceptive methods.11 This projects the need for scaling up of family planning initiatives and also to escalate the accessibility to information regarding the modern contraceptive methods which are proved to have more effectiveness when compared to other traditional methods of contraception. Health systems should ensure that every woman attending health centre should be offered contraceptive use assistance preferably with the help of standardized tools including the use of illustrations and easy-tocomprehend texts.

Conclusion:

Six out of 10 women had an unmet need for contraception. Contraceptive use was limited either due to inadequate knowledge or perceived sideeffects or due to restrictions. This high proportion of unmet needs mandates the scaling up of activities to increase awareness regarding modern contraceptives.

Limitations:

Our study estimates were limited to only two valley districts Manipur, hence there is an imperative need to additionally assess the unmet need and the contraceptive use pattern in the areas of the hilly regions where health care facilities are usually hardto-reach. There is also a necessity for the conduct of qualitative research studies to understand the unhealthy attitudes towards family planning and also to recognize the barriers to contraception usage. Studies for capacity assessment of health centres and methods to monitor the counseling strategies and communication methods of health care workers with their clients are reckoned to be beneficial in near future to eventually improve the reproductive health of the woman.

Declaration:

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Assessment of Refractive Status of 5-15 Years Old Children Attending Government Schools of Rural Agra

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Abstract:

Introduction: In children uncorrected refractive errors have a profound effect on educational and psychosocial development hence it is necessary to estimate the prevalence both at the community and at the school level to aid planning and implementation of refractive error services in children. Objective: To determine the refractive status of 5 to 15 years old children attending government schools of rural areas of district Agra, Uttar Pradesh (UP), India. Method: Study conducted on 902 students of age group 5-15 years of randomly selected government schools of Bichpuri Block of district Agra. Children underwent visual acuity assessment and torch light examination, height and weight measurement. Children with VA $\leq 6/9$ were further examined and cycloplegic retinoscopy, fundus examination, slit lamp examination and post mydriatic refraction was done. On the basis of values of cycloplegic refraction and post mydriatic refraction, refractive error was classified as myopia, hypermetropia and astigmatism. Statistical Analysis was done by applying Chi square test. **Results**: Out of 902 children, 125 children (13.86 %) were having refractive error of which 76 were myopic (8.43%), 39 were astigmatic (4.32%) and 10 were hypermetropic (1.11%). There was an increase in the overall prevalence of refractive error with advancing age. There was no significant association of refractive error with gender and nutritional status. Conclusion: Vision screening of school children is very useful for early detection and correction of refractive errors. Screening of the refractive errors in school should be carried out periodically and regularly.

Keywords: Astigmatism, Hypermetropia, Myopia, Refractive Error

Introduction:

Vision is a facility or a state of being able to see. As vision is the major sensory modality in humans, normal vision is important for the general development of a child. Visual impairment has significant implications on the affected child and family in terms of education, future employment and personal and social welfare throughout life, so early detection and treatment of refractive errors in children is very important.

Uncorrected refractive errors are the most common cause of visual impairment around the world^[1] and in children uncorrected refractive errors and their consequences have a profound effect on their overall development, most importantly on educational and psychosocial development.^[2,3]

The prevalence of childhood blindness in India is 0.17%. Treatable refractive error causes 33.3% of the

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blindness followed by 16.6% due to preventable causes.^[4] The control of blindness in children is considered a high priority within the World Health Organization's (WHO's) VISION 2020 — The Right to Sight programme.^[5]

Refractive error has not gained much attention among the causes of blindness. It is because blindness is mostly defined on the basis of best corrected visual acuity (BCVA). However, if blindness was defined on the basis of presenting distant visual acuity, uncorrected refractive errors are the second most common cause of blindness after cataract.^[6] Although refractive errors cannot be prevented, they can be treated. Diagnosis and treatment of refractive error is relatively simple and is one of the easiest ways to reduce impaired vision.

In India, as per census 2011 there are nearly 253 million children aged 5-14 years of age (24.60% of the population),^[7] therefore, providing vision screening for all children is a daunting task. The availability of eye care services in the country varies between and within regions. Given these disparities, school based vision screening services are considered cost effective in detecting correctable causes of decreased vision.^[8] As part of the National Program for Control of Blindness, school vision screening is widely practiced at present in the country.^[9] Hence it is necessary to estimate the prevalence both at the community and at the school level to aid planning and implementation of refractive error services in children.

Refractive errors may appear throughout childhood and adolescence. If refractive errors are left untreated they can result in amblyopia and/or strabismus hence vision screening should be done to identify children with uncorrected refractive error, so that treatment can be offered before educational and social progress is affected.

Method:

This study was a cross sectional observational study conducted among 902 students of age group 5

to 15 years of randomly selected government primary and junior high schools of Bichpuri block of district Agra. Permission was taken from the Institutional Ethical Committee and Basic Shiksha Adhikari of Basic Education Department of district Agra. The sample size was calculated by taking prevalence of refractive errors in school going children 10.8% at 95% confidence interval and 20% allowable error and was 818 which had been rounded off to 900. The study was carried out from September 2018 to September 2020.

Exclusion Criteria of this study were children with congenital glaucoma, congenital cataract, corneal diseases, history of ocular trauma, children with diseases of posterior segment, children with neurological disorder, children with infective ocular diseases.

A standard examination procedure was used for every children. Height, weight were recorded and torch light ocular examination and assessment of VA by Snellen's E chart was done. Height was measured using a portable stadiometer. Weight was measured using an electronic weighing balance. Body mass index for age (5-19years) based on Z Score^[10,11] was used to determine the nutritional status.

Cycloplegic retinoscopy, dilated fundus examination, slit lamp examination and post mydriatic refraction was performed on children having VA≤6/9 after taking informed consent from parents of children. On the basis of values of cycloplegic refraction and post mydriatic refraction, refractive error was classified as myopia, hypermetropia and astigmatism.

Myopia was considered when the measured refractive error was more than or equal to -0.5 spherical equivalent diopters in one or both eyes. Hypermetropia was considered when the measured objective refraction was greater than or equal to +2.00 spherical equivalent diopters in one or both eyes, so long as neither eye had myopia. Astigmatism was considered to be visually significant if ≥ 0.75 D.^[12]

Age group	Number of children	Мус	opia	Hyperm	netropia	Astigmatism		To Refracti	Total Refractive Error	
(yrs)	(N)	(n)	%	(n)	%	(n)	%	(n)	%	
5-7	173	8	4.62	5	2.89	2	1.16	15	8.67	
8-10	329	26	7.90	2	0.61	14	4.25	42	12.67	
11-13	313	29	9.26	2	0.64	20	6.39	51	16.29	
14-15	87	13	14.94	1	1.15	3	3.45	17	19.54	
Total students	902	76	8.43	10	1.11	39	4.32	125	13.86	
p-value	p-value		0.038 0)55	0.0	55	0.0)43	
Chi- square	value	8.	43	6.	39	7.	59	8.	43	

Fable 1: Prevalence of refractive error	(Myopia, 1	Hypermetro	pia and Astig	gmatism) as	s per age group

Table 2: Gender wise prevalence of refractive error	(Myopia, Hypermetropia and Astigmatism)
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Gender	Мус	opia	Hypern	netropia	Astigmatism Total Refractive Er			tal ve Error
	(n)	%	(n)	%	(n)	%	(n)	%
Boys (n=466)	34	7.30	4	0.86	22	4.72	60	12.88
Girls (n=436)	42	9.63	6	1.38	17	3.90	65	14.91
Total students (n=902)	76	8.43	10	1.11	39	4.32	125	13.86
p-value 0.207		207	0.458		0.544		0.207	
Chi-square value	1.59		0.551		1.69		1.59	

Nutritional	Муоріа		Hypermetropia		Astigmatism		Total Refractive Error	
Status	(n)	%	(n)	%	(n)	%	(n)	%
Thin (n=219)	23	10.50	1	0.46	9	4.11	33	15.07
Normal (n=667)	50	7.50	8	1.20	30	4.50	88	13.19
Overweight (n=12)	2	16.67	1	8.33	0	0	3	25.00
Obese (n=4)	1	25.00	0	0.00	0	0	1	25.00
Total students (n=902)	76	8.43	10	1.11	39	4.32	125	13.86
p-value	0.217		0.084		0.850		0.536	
Chi-square value	4.	55	6.	66	0.7	'96	2.18	

All data was collected on a preformed data collection form. After collection, whole data was compiled on Microsoft Office Excel spreadsheet and Chi-square test was used to analyze differences in the refractive errors between boys and girls and among different age groups. p value <0.05 was considered significant.

Results:

This study was conducted among 902 children of age group 5-15 years. The mean age of overall study population was 10.02±2.63 years. 466 children (51.66%) were boys and 436 children (48.34%) were girls. Boy to girl ratio was 1:0.94.

Out of these 902 children, 125 children were having refractive error of which 76 were myopic, 10

were hypermetropic and 39 were astigmatic. The prevalence of refractive error in our study was found to be 13.86%.

Table 1 shows that myopia was found to be the most common type of refractive error and was observed in 76 children (8.43% of study population) which contributed 60.80% of all the refractive error. Hypermetropia was observed in 10 children (1.11% of study population) who contributed 8.00% of all the refractive error. Astigmatism was observed in 39 children (4.32% of study population) who contributed 31.2% of all the refractive error.

There was an increase in the overall prevalence of refractive error with advancing age which was statistically significant (p<0.05) as shown in Table 1.

There was an increase in prevalence of myopia with increase in age which was statistically significant (p<0.05) while there was no statistically significant association (p>0.05) found between hypermetropia and astigmatism with increase in age as shown in Table 1.

Prevalence of refractive error in girls (14.91%) was observed to be more than boys (12.88%) but this was statistically not significant (p>0.05) as shown in Table 2.

There was no significant association of gender with myopia, hypermetropia and astigmatism as shown in Table 2.

There was no statistically significant association found between nutritional status and refractive error (p> 0.05). Refractive error was found highest (25%) among overweight and obese children, while it was present in 15% of thin or underweight children and 13% in children with normal range of BMI for Age with z score as shown in Table 3.

Discussion:

In the present study VA $\leq 6/9$ was taken as a defective vision. Among 902 children, 125 children had refractive error so the prevalence of refractive error in our study was found to be 13.86 % (Table 1).

This finding was similar to those of Gupta et al^[13] where prevalence of refractive error (VA $\leq 6/9$) was found to be 13.2 % in school children (4-12years) of Aligarh. Batra et al^[14] also observed that the prevalence of refractive error (VA $\leq 6/9$) was 12.7% in school children (5-15 years) from both rural and urban areas of Ludhiana city. S Seema et al^[15] also observed that the prevalence of refractive error (VA $\leq 6/9$) was 13.6 % in school children (6-15 years) in a rural block of Haryana. A similar study was also conducted by Kumar MN et al^[16] in school children of 5-15 years age group of urban and rural areas of Ludhiana city and prevalence of refractive error (VA $\leq 6/9$) was found to be 13.9%.

However, this prevalence was higher when compared to that observed by GVS Murthy et $al^{[17]}$ in New Delhi (6.4%) and Kumar et $al^{[18]}$ in Lucknow (7.4%), Pavithra MB et $al^{[19]}$ in Bangalore (7.03%), Deshpande Jayant D et $al^{[20]}$ in rural North Maharashtra (10.12%). As compared to our study, much higher prevalence of refractive error was observed by Das A et $al^{[21]}$ (25.11%) and Sonam sethi et $al^{[22]}$ (25.32%).

In our study the most common refractive error was myopia (60.80%) followed by astigmatism (31.20%) followed by hypermetropia (8.00%). This result was similar to the study conducted by S Seema et al,^[15] Pavithra MB et al,^[19] Rahman M^[23] and Sethu S et al^[24] who observed that commonest refractive error among school children was myopia followed by astigmatism and hypermetropia, whereas Tarannum Shakeel et al^[25] found that most common refractive error was astigmatism followed by myopia and hypermetropia.

There is an increase in the prevalence of refractive error with advancing age which was statistically significant (p<0.05) as shown in Table 1 which was comparable with the study conducted by Pavithra et al,^[19] Tarannum Shakeel et al^[25]

It was observed that there was a significant association of increase in myopia (p<0.05) with older age groups however statistically significant

association (p>0.05) was not found between astigmatism, hypermetropia with an increase in the age. Murthy et $al^{[17]}$, Batra et $al^{[14]}$, S Seema et $al^{[15]}$, Pavithra MB et $al^{[19]}$, all reported that there was an increase in cases of myopia with increasing age.

In our study, there was no statistically significant difference in the prevalence of refractive error between boys and girls (p> 0.05). This was similar to the results observed by Tarannum Shakeel et al^[25], Ande V R et al^[26] and Krishnan V M et al.^[27] However, studies conducted by S Seema et al^[15], Pavithra MB et al^[19] showed evidence of increased refractive errors in girls, whereas Rahman M et al^[23], Bhattacharya RN et al^[28], Sriram C et al^[29] found refractive error to be more prevalent in male students than female students.

There was no statistically significant difference in the prevalence of myopia, hypermetropia and astigmatism between boys and girls in our study (p>0.05). Similar results were observed by Krishnan VM et al^[27] in a study conducted in Villupuram and Puducherry. Whereas Batra et al^[14], Pavithra MB et al^[19] observed a significant association of hypermetropia with females and Saxena R et al^[30] observed that myopia was higher among girls than boys.

In our study, refractive error was found lesser in children with normal BMI for age as compared to thin, overweight and obese children but this was not statistically significant (p>0.05).

There is no statistically significant association found between myopia, hypermetropia and astigmatism with nutritional status (p>0.05). Similar result was also found by Nanda Wahyu Anandita et $al^{[31]}$ who concluded that there was no significant association between anthropometric parameters and dietary factors with refractive error whereas Fen Yang et $al^{[32]}$ observed that high BMI (>19.81 kg/m2) was associated with a higher visual impairment.

Conclusion:

Refractive error is a common cause of visual impairment among school children. Myopia was found to be the most common refractive error. Children often do not complain of defective vision and may not even be aware of their problem. There is also lack of awareness about refractive error in children at the family and the community level. Our study supports that vision screening of school children is very useful for early detection and correction of refractive errors. Screening of the refractive errors in school should be carried out periodically and regularly. In India, as part of the National Program for Control of Blindness, a School Eye Screening Program has been in place for more than two decades. Overall, outcome of our study is in the favour of vision screening and spectacle correction in the school children through School Eye Screening Programme.

Declaration:

Conflict of Interest: Nil

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Assessment of Vitamin D Status in General Population of Kashmir Valley of Indian Subcontinent

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Abstract:

Introduction: The prevalence of vitamin D deficiency is reported to be high throughout the world. Overt Vitamin D deficiency manifests as rickets, birth defects and fractures in children. In adults, its manifestations include osteoporosis, osteomalacia, osteoarthritis, chronic muscular pain, increased risk of fractures, several endocrine, cardiovascular, immunological and neurologic disorders, some types of cancers, and depression. **Objectives:** To assess the Vitamin D status in general population of Kashmir valley by measuring serum 25-hydroxyvitamin D [25 (OH) D] levels. **Method:** Total 270 healthy volunteers from differing professions (69 men and 201 non-pregnant/non-lactating women, aged 18–65 years), residing in Kashmir valley were selected for this study. The samples were collected in both summer and winter months. Vitamin D deficiency/insufficiency was defined as a Serum 25 (OH) D concentration of < 30 ng/ml. **Results:** 222 (82.2%) of the subjects studied had Vitamin D deficiency. 45 of the 69 males and 177 of the 201 females were found to be Vitamin D deficient. The prevalence of vitamin D deficiency ranged from 58 % in the farmers group to 93% in the employee group. Vitamin D deficient subjects had a significantly lower mean weekly exposure to sunlight. **Conclusion:** The prevalence of Vitamin D deficiency in Kashmir valley is high especially among women. Serum 25(OH) D concentrations are significantly related to sun exposure.

Keywords: Osteoporosis, Sunlight, Vitamin D

Introduction:

Serum 25- hydroxyvitamin D [25(OH) D] is the major circulating metabolite of vitamin D. It is the most commonly used and the most sensitive index of vitamin D status in the body acquired both from the cutaneous synthesis and dietary intake.^[1] Vitamin D which also known as 'the Sun Vitamin' is a fat-soluble vitamin with hormone-like activity, which regulates the functions of over 200 genes and is essential for growth and development of the body.^[2] Vitamin D deficiency is widespread throughout the world. It has

been estimated that almost one billion people in the world suffer from vitamin D deficiency or insufficiency.^[3] Thus, it has rightly been called as an epidemic across the globe and has been reported in young adults, healthy children, middle aged and elderly population. The two main sources of vitamin D are food and sunlight.^[4] There is low vitamin D content in natural food sources and therefore fortification is required. Non fortification of food stuffs, leads to generally low dietary intake of vitamin D and calcium.^[5] Sunlight is an important source of

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vitamin D in the body. Inadequate sun exposure, skin pigmentation, traditional clothing practices, latitude and seasonal climate are some of the factors that have significant influence on cutaneous photochemical synthesis of vitamin D in healthy individuals.^[6] Vitamin D deficiency is quite prevalent throughout the world, but it appears to be the worst in countries of South Asia, especially among children, women, and elderly. Overt vitamin D deficiency manifests as rickets, birth defects and fractures in children. In adults it manifests as osteoporosis, osteoarthritis, osteomalacia, chronic muscular pain and leads to an increased risk of fractures.^[7] Additionally, Vitamin D deficiency has also been suggested as a contributing factor in the development of several other diseases and conditions such as endocrine, cardiovascular diseases, diabetes, some types of cancer, immunologic diseases, neurological disorders, and depression.^[8] In this study, we aim to assess the status of vitamin D in healthy volunteers of Kashmir Valley.

Objectives:

The specific objectives of the study were:

- To assess Vitamin D status in general population of Kashmir valley.
- To assess Vitamin D levels in comparison with BMI, socioeconomic status, history of taking supplements and daily sun exposure in general population of Kashmir valley.

Method:

A community based cross sectional study was conducted from the year January 2019 to December 2020 in Kashmir valley at SKIMS Medical College Hospital, Bemina, Srinagar, J&K, India.

Inclusion criteria:

- Age between 18 years to 65 years
- Healthy volunteers from the attendants who accompanied patients at general OPD/IPD
- Healthy volunteers from medical profession
- Both sexes

Exclusion criteria:

- Extremes of age (Age < 18 years and > 65 years)
- Patients with uncontrolled medical co morbidities (Uncontrolled diabetes, uncontrolled hypertension)
- Patients with chronic kidney diseases, autoimmune disorders, connective tissue disorders.
- Pregnant, lactating women.
- Persons taking Vitamin D supplementation.

Sample size and selection of subjects : In this study, a total of 352 healthy volunteers aged 18 – 65 years were approached and screened for eligibility. The subjects were required to be apparently healthy, residing in Kashmir valley and without any suggestion of liver, kidney or Gastro-intestinal disease. Furthermore, pregnant, lactating and persons taking Vitamin D supplementation were excluded from the study. Out of the 352 volunteers approached, only 270 fulfilled the criteria and were selected for the study. The subjects who participated in the study were farmers [36 in number], employees [42 in number], housewives [72 in number], medical professionals [66 in number] and students [54 in number]. The medical professionals included doctors and nurses from our institute. After taking an informed written consent, a detailed history regarding age, occupation, monthly income, medical comorbidities, average daily sun exposure and supplementation was taken from the subjects. Weight in kg's and height in metres of every subject was measured and BMI (kg/m^2) calculated.

Blood collection & sample analysis : A blood sample (3 ml) was collected from all volunteers in our hospital using the standard procedure for blood collection. The blood sample was taken before giving any Vitamin D supplements. These blood samples were analysed for Vitamin D3 using Chemiluminescent Immune Assay (CLIA) method on LIAISON.^[9]

Anthropometric profile : Weight and height of all the volunteers were assessed by following the recommended procedure of WHO (1983).^[10] For measuring weight and height of the individuals, a beam scale was calibrated with standard weights and measuring tapes. Before measuring weight, the volunteers were asked to remove heavy clothing, shoes, purse, and other unnecessary things and then the weight was noted up to the nearest 0.01 kg. Similarly, before taking height measurements, the subjects were asked to remove the head cap, shoes, and heavy garments and to stand in the centre of the platform of the scale, looking straight with his head, back, buttocks, calves and heels touching the rod. The head piece was the levelled and height was recorded up to the nearest 0.1cm. Body mass index (BMI) was calculated with the help of the formula $[Kg/M^2]$.^[11]

Assessment of socio-economic status : A pretested semi-structured questionnaire was used to elicit information on socio-demographic profile. Assessment of Socio-economic status was done using Kuppuswamy's Socio-economic scale.^[12]

Physical activity level : The standard methodology was used for calculating the value of the physical activity level [PAL].^[13] Each subject was given an oral questionnaire in which 24 hours of a day were divided into 48 slots of 30 min each. The subject was enquired about the type of physical activity undertaken by him/her in each 30-minute time slot during last 24 hours. The type of physical activities was divided into light, moderate or heavy based on metabolic equivalent of task values.^[13] The basal metabolic rate (BMR) of each subject for 24 hours was calculated using the FAO-WHO equation given for each age group.^[13] The BMR per minute of each subject was calculated by dividing BMR of a subject by a figure of 1440 (24 $h \times 60 = 1440$ min). The time spent on each of the physical activity by the subject was multiplied with the metabolic equivalent value for that physical activity and calorie expenditure on different physical activities undertaken by the subject was calculated. The total energy expenditure

(TEE) done by the subject on physical activities in 24 hours was multiplied by BMR per minute and the TEE of the subject was calculated for the 24 h. The TEE value obtained was divided by BMR of the subject and PAL value was calculated. Sedentary lifestyle was classified as PAL less than 1.4. A PAL of 1.4 to 1.54 was classified as low physically active lifestyle and a PAL of > 1.55 was taken as moderately active/active lifestyle.^[13]

Assessment of exposure to sunshine: A questionnaire was utilized to elicit the information regarding the time spent in the sunshine in the last 24 hours during routine daily activities from the subjects. Area of body exposed to sunlight was calculated with the help of Wallace's Rule of Nine.^[14] The type of clothing worn by the subjects and the total duration in minutes and body area (percentage) under direct sunshine was recorded.

Dietary profile : The pattern of dietary consumption of foods was collected by administering the food frequency questionnaire. The questionnaire was divided into two parts: The first part comprised 40 food groups and quantified the frequency of consumption. The second part was composed of 10 questions. Six were qualitative questions about eating habits (e.g., meal frequency, socialization during meals, source of food supplies), and four questions were used to obtain nutritional data, of which two provided more detailed information about some food groups from the first part of the questionnaire (i.e., fish and soft drinks).^[15]

Statistical analysis : The collected data were entered into IBM SPSS (statistical package for social sciences) version 20.0. Continuous variables were expressed as mean <u>+</u> Standard deviation with its respective range. Nominal and ordinal variables were expressed as proportions. The Chi-Square and Fishers exact tests were used for comparison of different groups and a p- value of < 0.05 was taken as statistically significant.

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Results:

Table 1: Relationship between serum Vitamin D levels with differe	ent parameters in young adults of
Kashmir valley in Indian subcontinent (n=270)	

Sr.	Cocio Domographia fostor	Distribution of s to level of Vita	1 4		
No.	Socio-Demographic lactor	Deficient /Insufficient (<30ng/ml) n (%)		p value*	
1	Male	45 (65.2)	24 (35)	0.000018	
	Female	177 (88)	24 (12)		
	Upper socio-economic class	57 (86)	9 (14)	0.00026	
2	Middle socio-economic class	87 (91)	9 (9)		
	Lower socio-economic class	75 (69)	33 (31)		
	Sunlight exposure Time 0-60 min	120 (91)	12 (9)	0.000025	
3	Sunlight exposure Time 61-150(min)	88 (85)	16 (15)		
	Sunlight exposure Time more than 151 (min)	20 (59)	14 (41)		
1	Sunscreen use –Yes	32 (80)	8 (20)	0.4455	
4	Sunscreen use- No	195 (85)	35 (15)		
S	Sedentary lifestyle (PAL <1.4)	144 (89)	18 (11)	0.000038	
5	PAL 1.4-1.54	54 (75)	18 (25)		
	PAL ≥1.55	21 (58)	15 (42)		
6	Serum calcium (8.5 to 10.4mg/dl)	173 (91.5)	16 (8.5)	0.064	
0	Serum calcium (>10.4 mg/dl)	74 (91)	7 (9)	0.964	
Serui	Serum Phosphorus (<2.5 mg/dl)	7 (87.5)	1(12.5)	0.00092	
7	Serum Phosphorus (2.5 to 4.8 mg/dl)	216 (94)	14 (6)		
	Serum Phosphorus (>4.8 mg/dl)	31 (97)	1(3)		
8	Serum ALP (<180 IU/l)	90 (95)	5 (5)	- 0.87	
	Serum ALP (180-1200 IU/l)	165 (94)	10 (6)		
0	BMI (<25)	138 (87)	20 (13)	0.64	
9	BMI (≥25)	84 (75)	28 (25)	0.04	

* P Value <0.05 show that level of vitamin D have a significant association with socio-demographic data and value >0.05 did not have any significant association between level of vitamin D and socio-demographic data.

Exposure to sunlight was related significantly to serum 25 (OH) D values. As a group, subjects with vitamin D deficiency had a significantly lower sunlight exposure time compared to those who were vitamin D sufficient. (Table 1) The serum concentrations of calcium and alkaline phosphatase were comparable in subjects with and without vitamin D deficiency. (Table 1) A total of 270 subjects

(69 males and 201 non-pregnant females) belonging to five different groups (farmer, employed, household, medical personnel, and students) were evaluated for vitamin D deficiency. The subjects studied had a mean age of 35.15 years+ 4.5 years (range 18–65 years). Overall, 222 (82.2%) of the subjects studied had vitamin D deficiency/ insufficiency, defined as serum 25 (OH) D < 30
Occupation	Vitamin D deficient (n=222) n (Male:female) (%)	Vitamin D sufficient (n=48) n (Male:female)(%)	Vitamin D levels (ng/ml)
Farmer	21(21:0)(58.3)	15(15:0)(41.7)	25.6 ± 12.8
Housewife	54(0:54)(75)	18(0:18)(25)	21.9 ± 19.9
Employee	39(3:36)(92.8)	3(0:3)(7.2)	12.7 ± 15.8
Medical professional	57(18:39)(86.4)	9(9:0)(13.6)	20.8 ± 10.9
Student	48(3:45)(88.9)	6(0:6)(11.1)	19.7 ± 10.1

Table 2: Occupation	of subjects in relatio	n to vitamin D status
Tuble Li Occupation	of Subjects in Telutio	n to vitamin D Status

Table 3: Gender in relation to vitamin D status

Gender	No. of persons (%)	Vit D (ng/ml)
Male	69(25.5)	24.6 ± 12.8
Female	201(74.5)	18.7 ± 13.0

ng/ml.^[16] About 65% (45 of 69) of the males and nearly all 88% (177 of 201) of the females studied were vitamin D deficient. Between 70–100% subjects in different groups were documented to have vitamin D deficiency (Table 2) except farmers.

The average vitamin D status was low in females as compared to males. Probable factors for this deficient state were household occupation, decreased sun exposure and decreased body area exposure due to veiling. (Table 3)

Discussion:

In our study around 88% of the females were found to be Vit D deficient/ insufficient. In similar studies performed by Webb AR et al.^[17] and Taha SA et al.^[18], Vit D levels were found to be significantly low in females as compared to males. This was attributable to significantly less sun exposure and decreased body surface area exposure as compared to male counterparts. The lower Vit D levels in females can also be explained due to the cultural practice of wearing clothes that cover most of the body and remaining indoors for household work.^[18]

Socioeconomic profile of the patients plays a role on mean Vit D levels. In our study, the bulk of the persons categorised as belonging to lower socioeconomic status, were farmers by profession. The mean Vit D levels were the highest in this subset of our study groups. Professionals belonging to higher socio- economic status had the lowest mean Vit D levels. This can be explained by the fact that farmers have a higher exposure to sunlight as compared to professionals working indoors. In our study 91 % of the patients having a daily exposure of 0-60 minutes to sunlight had Vit D insufficiency. This was in contrast to 59% for patients having a daily exposure to sunlight of more than 151 minutes. Hence, we found a significant correlation between mean exposure to sunlight and Vit D levels (p value = 0.000025).

No significant correlation was found between the use of sunscreen and the mean Vit D levels in our study (p value = 0.4455). A study by Young AR, Narbutt J et al,^[19] concluded that sunscreens when used optimally to prevent sunburns, allowed for excellent Vit D synthesis. Hence, the benefits of sunscreen can be obtained without compromising cutaneous Vit D synthesis.

The role of physical activity and the mean levels of Vit D needs to be emphasized. In our study we found a statistically significant correlation between physical activity and mean Vit D levels. Physical activity refers to any movement caused by a muscle contraction resulting in increased energy expenditure than at rest. Physical exercise refers to any well-structured, repetitive physical activity aimed at improving the general health of the individual. Outdoor physical activity, due to exposure to sun has a beneficial effect on the levels of Vit D. In addition, indoor physical activity has also shown to be associated with higher levels of Vit D suggesting that Vit D concentration is not only associated with sun exposure.^[20]

We found the serum concentrations of calcium and alkaline phosphatase to be comparable with or without Vit D deficiency. Calcium hemostasis in the human body is maintained by a variety of factors including Parathyroid hormone (PTH) and calcitonin. The levels of PTH and calcitonin were not available in our study. While some authors argue that the cut off levels of 25 (OH) D to define Vit D deficiency should be linked to changes in the PTH concentration, at present there are no clear-cut guidelines for the same. However, we found a statistically significant correlation between phosphate levels and Vit D levels (p value = 0.00092). 1,25 (OH) 2D can regulate serum phosphate level either directly or indirectly through modulating expression of fibroblast growth factor -23 (FGF23) as well as working as a calciotropic hormone. Therefore, phosphate and vitamin D metabolism are highly interconnected.^[21]

Alkaline phosphatase (ALP) is a group of identical enzymes that are native to four homologous alkaline phosphatase genes.^[22] Three out of these four genes encode for tissue specific enzymes, while the remaining one is present in many body tissues like bone, kidneys, and liver. Although, alkaline phosphatase is considered to be a factor required for the synthesis and mineralization of new bone, its exact function is still unknown. Being a product of osteoblasts, raised serum levels of alkaline phosphatase indicate a state of increased bone turnover. However, the correlation between ALP levels and Vit D levels has not been found to be significant. In our study we obtained a statistically insignificant relationship between the two (p value = 0.87). Hence the levels of ALP should not be used to screen/diagnose patients with Vit D deficiency.

We found a statistically insignificant relationship between Vit D levels and BMI (p value=

0.64). Adiposity has been found to be strongly related, inversely to serum 25 (OH) D and directly to parathyroid hormone (PTH) concentrations independent of age, sex, season, or smoking. The association has been found to be weaker if anthropometric measures are used, implying a specific role for adipose tissue.^[23,24] The lack of any consistent relationship between BMI and serum 25 (OH) D in our study needs to be seen in that perspective. In addition, none of the subjects in our study was actually obese (BMI > 30 Kg/M²).

The limitations of this study include a relatively small size, failure to study all subjects in both summer and winter, and lack of data on percentage of body fat of the subjects studied. Further, PTH levels were not available in our subjects. We have demonstrated a very high prevalence of vitamin D inadequacy in apparently healthy, young adults. It is likely to be even higher and more severe in children, the elderly, and in pregnant women. Given the importance of vitamin D in the regulation of calcium and phosphorous homeostasis and musculoskeletal health, its emerging role in extra-skeletal health, and the magnitude of deficiency of this vitamin, fortification of certain commonly used food items may be required.

Conclusion:

Results of the study show that there is a deficiency or insufficiency of the vitamin D in general population of Kashmir valley of Indian subcontinent irrespective of age, gender, socio-economic status, sun exposure and medical history. This reaffirms the belief that Vitamin D deficiency is a pandemic.

Recommendations:

The study highlights the urgent need to make physicians aware of the high prevalence of Vitamin D deficiency. The need for improving the status of Vitamin D in the population by educating the people/ creating mass awareness and Vitamin D supplementations programmes is paramount.

Declaration:

Conflict of interests: Nil

Funding Information: Nil

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A Cross Sectional Study on Nutritional Status and Risk Factors Associated with Malnutrition among Elderly Population in Hyderabad

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Abstract:

Introduction: The elderly population is growing much faster. Ageing is a global phenomenon and it is expected that by 2050 every country in the world will have substantial increase in population aged 60 years and above. Malnutrition is common among older people over 60 years of age. They are likely to experience morbidity, premature mortality, poor quality of life and reduced functional ability than normally nourished persons. Malnutrition increases health care costs, reduces productivity, and slows economic growth, which can perpetuate a cycle of poverty and ill-health. Hence combating malnutrition in all its forms is one of the greatest global health challenges. **Objectives:** 1) To assess the nutritional status among elderly population in Hyderabad. 2) To assess the risk factors which are associated with malnutrition among elderly population. Method: A Cross sectional study was conducted in July - September 2021 among elderly persons aged 60 years and above residing in urban slums of Hyderabad. Considering the estimated prevalence of malnutrition among elderly population to be 14.5%, the sample size was calculated as 198 and was rounded off to 200. Data was entered into Microsoft Excel and analysed using Epi Info version 7.2.2.6. A predesigned, pre-tested questionnaire was used to collect data. Malnutrition was assessed using Mini Nutritional Assessment (MNA). Results: Among 200 participants, 52.5% were females. The mean age of the study population was 68.3 years. Among them 18% of the study participants were malnourished, 27% were at risk of malnutrition and 55% had normal nutritional status. **Conclusion:** Early diagnosis and prompt treatment of elderly people at high risk for malnutrition may improve their nutritional status and prognosis.

Keywords: Elderly, Malnutrition, Mini Nutritional Assessment (MNA)

Introduction:

The global population is ageing rapidly due to demographic transition, advances in medical technologies, urbanization, migration and changing gender norms. According to WHO, between 2015 and 2050, the proportion of the world's population over 60 years will nearly double, from 12% to 22%.^[1] By 2050, 80% of all older people will live in low- and middle-income countries.^[1] The World Health

Organization (WHO) has stated that aging populations will present new challenges to health care.^[2] The health of the elderly will be an important issue defining the health status of a population. The health problems faced by the elderly population includes nutritional problems, chronic noncommunicable diseases like Diabetes, Hypertension, Heart disease, stroke, hearing loss, cataracts and refractive errors, back and neck pain, osteoarthritis,

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chronic obstructive pulmonary disease, depression, and dementia and others. Nutritional problem, especially undernutrition is one of the common public health problems in the older age group causing greater morbidity, mortality and economic loss especially in developing countries.

Although some of the variations in older people's health are genetic, much is due to people's physical and social environments – including their homes, neighborhoods, and communities, as well as their personal characteristics – such as their sex, ethnicity, or socioeconomic status.^[1] Environment have an important influence on the development and maintenance of healthy behaviour. Maintaining healthy behaviour throughout life, particularly eating a balanced diet, engaging in regular physical activity, and refraining from tobacco use and other addictions reduces the risk of non-communicable diseases and improves both physical and mental health.

The magnitude of malnutrition among the elderly population in India is under-reported. In India, a very few community studies have been conducted to estimate malnutrition among elderly.

Objectives:

- 1) To assess the nutritional status among elderly population in Hyderabad.
- 2) To assess the risk factors which are associated with malnutrition among elderly population.

Method:

A Cross sectional study was conducted in July -September 2021 among elderly persons aged 60 years and above residing in urban slums of Hyderabad. All the elderly population aged 60 years and above were listed out. Considering the estimated prevalence of malnutrition among elderly to be 14.5% based on the study done by Neeta Mathur et al, the sample size was calculated using the formula $4pq/l^2$ as 198 and was rounded off to 200.^[3] After taking permission from the Institutional Ethical Committee, interviews were conducted among the study participants who were chosen by simple random sampling. All the participants who have given informed consent were included in the study. Those who were severely ill and those who did not give informed consent were excluded from the study. A predesigned, pre-tested questionnaire was used to collect data. Malnutrition was assessed using Mini Nutritional Assessment (MNA)^[4] with total score as 30 points. Malnutrition Indicator Score of 24 to 30 points indicates Normal nutritional status. A score of 17 to 23.5 points indicates At risk of malnutrition and less than 17 points indicates Malnourishment.

Anthropometric measurements were taken and it consisted of weight, height, mid upper arm circumference (MUAC) and calf circumference (CC). For MUAC, 24 cm was taken as cut off and for CC, 26.5cm as cut off.^[5] BMI< 18.5 kg/m² were considered underweight, those with BMI of 18.5-22.9 kg/m² were normal weight, those with BMI 23.0-24.9 kg/m² were overweight and those with BMI 25.0 kg/m² or above were obese, according to the WHO Asian adult body weight standard.^[6]

Statistical analysis : Data was entered into Microsoft Excel and analysed using Epi Info version 7.2.2.6. For continuous variables, mean and standard deviation(SD) were used to present the data. For categorical variables frequencies and percentages were used. Appropriate tests of significance were applied wherever necessary at 5% level of significance. The p value <0.05 was considered as statistically significant at 95% confidence level.

Results:

The mean age of the study population was 68.3 years. Figure 1 shows the distribution of the study participants according to the nutritional status. 18% (36) of the study participants were malnourished. Normal nutritional status was seen in 55% (110) of the study population and 27% (54) were at risk of malnutrition.

Table 1 shows the socio-demographic characteristics of the study participants. Among 200 participants, 52.5% (102) were females. Majority of the study participants (51%) were belonging to Hindu religion, 34% were literates and 59% were



Figure 1: Nutritional status of the study participants

Table 1: Socio-demographic characteristics of study participants (n=200)

Variabl	n (%)	
	<65	90 (45)
Age (in years)	65-75	92 (46)
	>75	18 (9)
Condon	Male	123 (61.5)
Gender	Female	77 (38.5)
	Hindu	102 (51)
Religion	Muslim	71 (35.5)
	Christian	27 (13.5)
Literacy status	Literate	68 (34)
	Illiterate	132 (66)
	Unmarried	48 (24)
Marital status	Married	140 (70)
	Separated/Divorced	12 (6)
	III	58 (29)
Socio-economic	IV	24 (12)
	V	118 (59)

belonging to socio-economic class V according to modified Kuppuswamy's classification.

Table 2 shows the association between nutritional status and anthropometric measurements of elderly people. There was a significant association between nutritional status and the variables such as weight, Body Mass Index, Mid-Upper Arm Circumference and Calf circumference (p<0.05). Table 3 shows the comparison of sociodemographic characteristics with the nutritional status. The risk factors associated with malnutrition were old age(p=0.017), illiteracy(p<0.05) and inadequate calorie intake (p=0.006).

Discussion:

This study was done to estimate the prevalence and risk factors associated with malnutrition among elderly population in Hyderabad. In the present study, 18% (36) of the study participants were malnourished, 27% (54) were at risk of malnutrition and 55% (110) had normal nutritional status. Age above 65 years (p=0.017), illiteracy(p<0.05), inadequate calorie intake (p=0.006), body weight, Body Mass Index, Mid-Upper Arm Circumference and Calf circumference (p<0.05) were statistically significant factors which were associated with the nutritional status in the present study.

In the present study, age above 65 years (p=0.017) is a significant risk factor associated with the nutritional status. This is in accordance with the study conducted by Konda S et al which showed, older age was associated with lower MNA scores.^[7] Similar findings were also seen in a study done by Agarwalla R et al which showed that a significant relationship was observed between age groups and MNA status.^[8]

In the present study, there was a significant association between literacy status (p<0.05) and malnutrition. A study done by Ghimire S et al showed that a higher educational level contributes to a better nutritional status.^[9] The reason for better nutritional status could be due to better lifestyle and higher literacy level.

In the present study, there was significant association between calorie intake (p=0.006) and the nutritional status. Similar observations were seen in the study done by Vedantam et al in South India where low calorie intake due to problems with chewing and difficulty preparing or eating full meals contribute to poor nutritional status.^[10] Similar findings were also seen in a study done by Konda S et al which showed that lower MNA scores were

Table 2: Association between nutritional status and anthropometric measurements of elderly people (n=200)

Variable	Well nourished	At risk of malnutrition	Malnourished	p value
n (%)	110(55)	54(27)	36(18)	
Weight (kg)	66.2+3.2	59.8+ 4.3	49.2+ 6.4	0.0000001
Height (cm)	163+ 5.6	162+ 2.4	163+ 3.8	0.40
BMI (kg/m ²)	25+0.6	23.1+ 4.5	20.3+ 2.3	0.0001
MUAC(cm)	26.3+5.8	24.2+5.2	20.5+2.2	0.000001
CC(cm)	33.1+2.3	30.5+3.2	26.9+1.8	0.0001

p<0.05 was considered significant. ANOVA test was applied.

Table 3: Comparison of socio-demographic characteristics with nutritional status
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Variables		Well nourished	At risk of malnutrition	Malnourished	Chi square	p value
	<65	60 (30%)	21(10.5%)	9(4.5%)		0.017
Age (in years)	65-75	44(22%)	26 (13%)	22(11%)	12.01	
	>75	6 (3%)	7 (3.5%)	5(2.5%)		
Condon	Male	71 (35.5%)	32(16%)	20(10%)	1 002	0 500
Gender	Female	39 (19.5%)	22(11%)	16(8%)	1.083	0.582
	Hindu	56 (28%)	28(14%)	18(9%)		
Religion	Muslim	39 (19.5%)	20(10%)	12(6%)	0.595	0.963
	Christian	15 (7.5%)	6(3%)	6(3%)		
Litoracy status	Literate	58 (29%)	5(2.5%)	5(2.5%)	38.41	0.0000001
Literacy status	Illiterate	52 (26%)	49(24.5%)	31(15.5%)		
	Unmarried	20 (10%)	18(9%)	10(5%)	6.662	0.157
Marital status	Married	82 (41%)	35(17.5%)	23(11.5%)		
	Seperated/Divorced	8(4%)	1(0.5%)	3(1.5%)		
	III	32(16%)	14(7%)	12(6%)		
Socio-economic	IV	9(4.5%)	10(5%)	5(2.5%)	4.369	0.358
Class	V	69(34.5%)	30(15%)	19(9.5%)		
Coloria intolvo	Inadequate	31(15.5%)	31(15.5%)	11(5.5%)	10.10	0.000
	Adequate	82(41%)	37(18.5%)	8(4%)	10.10	0.006
Comorbidity	Yes	68(34%)	42(21%)	10(5%)	0.221	
	No	48(24%)	26(13%)	6(3%)	0.221	0.095
Living	Yes	16(8%)	6(3%)	5(2.5%)	2.773	0.250
independently	No	100(50%)	57(28.5%)	16(8%)		0.250

p<0.05 was considered significant

associated with those elderly people who had less than three meals daily.^[7]

In this study, the elderly people with malnutrition had a significantly lower mean weight, BMI, MUAC and Calf Circumference than those who were well nourished. A study done by Ghimire S et al in rural Nepal also showed similar findings.^[9]

Conclusion:

In the present study, 18% of the study participants were malnourished, 27% were at risk of malnutrition. Age above 65 years , illiteracy, inadequate calorie intake , body weight, Body Mass Index, Mid-Upper Arm Circumference and Calf circumference were statistically significant factors which were associated with the nutritional status in the present study.

Recommendations:

Early diagnosis and prompt treatment of malnutrition among elderly people may improve their nutritional status and prognosis.

Limitations:

The present study was carried out in urban slums of Hyderabad. The results cannot be generalized to elderly population in rural areas. Information regarding other risk factors including economic burden and problems associated with old age were not taken into account which might have an impact on the nutritional status.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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Addiction to Online Video Games among First Year Medical Students of a College Located in Western India

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Abstract:

Introduction: Video gaming has become a popular leisure activity especially among students. This behavior in excess can result in significant impairment in personal, social, educational or other domains of life and can affect routine functioning. **Objectives :** To estimate the prevalence of addiction to online video games and to identify the association of addiction to online video games with gender among the first year medical students of a college located in western India. **Method :** A cross sectional study was conducted among 189 first year M.B.B.S students of batch 2019. Young's online gaming addiction scale was utilized. The questionnaire was administered by using Google Form and was analyzed using Microsoft Excel 2010. **Results :** The prevalence of addiction to online video games was 62.43% among1st year medical students. There was no statistically significant association seen between male and female students to addiction of video games. **Conclusion:** Students to be encouraged of rational use of internet for online video games to protect their physical and mental health.

Keywords: Addiction, Medical students, Video gaming

Introduction:

Gaming disorder is characterized by craving of the person to play video games. This may affect daily routine activities of the person, along with poor performance in studies, inability to meet the demands in occupation, other areas of important functioning and disturbances in family relationships.^[1] According to World Health Organization (WHO), gaming disorder is diagnosed after a period of at least 12 months, but earlier in the case of severity of signs and symptoms. WHO has recognized gaming disorder as a major problem and has been added under International Classification of Diseases – 11 (ICD-11), i.e. disorders due to substance use or addictive behaviors with a code 6C51.^[2] Internet use is one of the most important tools of our present-day society; however its impact can be seen in the form of increased use. It brings change in mood, an inability to control the amount of time spent with the Internet, withdrawal symptoms when not engaged, a diminishing social life, and adverse work or academic consequences, and it also affects self-esteem of the students.^[3]

Results of a systematic review of the literature by S. Mihara et al., shows the prevalence of Internet Gaming Disorder (IGD) in the total sample ranging from 0.7% to 27.5%.^[4] A study by M. Griffiths et al., suggested that Internet addicts become addicted to different aspects of online use where they are differentiated between three subtypes of Internet

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addicts: excessive gaming, online sexual preoccupation, and e-mailing/texting.^[5] There has been an explosive growth in the usage of Internet not only in India but also worldwide. Reports reveal that there were about 137 million Internet users in India in 2013 and India is predicted to be the world's second largest country in Internet use after China in the near future.^[6] According to the Internet and Mobile Association of India and Indian Market Research Bureau, out of 80 million active Internet users in urban India, 72% (58 million individuals) have accessed some form of social networking in 2013.^[6]

As there is scarce information on internet gaming addiction among medical students, the present study was conducted among the medical students of first year studying in a medical college located in western India to estimate the prevalence of addiction to online video games and to identify the association of addiction to online video games with gender.

Method:

A cross sectional study was conducted during August 2019, among newly admitted 189 first year M.B.B.S students of a medical college when they were undergoing Foundation Program. 189 out of 200 students who were present on day of data collection were included in the study. Young's internet addiction scale questionnaire^[7] was administered to collect data through Google Form with the help of mobile phones after taking informed and verbal consent. The questionnaire consists of 20 questions, related to usage of internet for online video game and its harmful effects. All questions were answered by using 5 point Likert scale ranging from "0" to "5" (The higher score suggests the greater level of addiction). The responses given by each individual student were summed up and divided into 4 categories based on scores; 0 - 19 = No addiction, 20 - 49 = Mild addiction, 50 - 79 = Moderate addiction and 80 - 100 = Severe addiction. Data was analyzed using Microsoft Excel 2010.

Results:

The mean age of students who participated in the study was 17 ± 0.5 years. Out of the total students, 71.5% were males and 28.5% were females. Majority of the students used Mobile phones (83%), followed by computers (17%) for playing games. The prevalence of addiction to online video games was 62.43% among 1^{st} year medical students. There was no statistically significant association seen between male and female students to addiction of video games.

Out of 189 participants, 71 (37.5%) students were not having any kind of addiction to online video games. While Mild, Moderate and Severe addiction was seen in 105 (55.6%), 12 (6.4%) & 1 (0.5%) respectively as shown in Figure 1.

Out of the 189 students, only one male student (0.7%) was having severe form of addiction to online video games. 50 (37.1%) male students and 21 (38.9%) female students were not addicted to any online video games. Mild addiction was found in 74 (54.8%) males and 31 (57.4%) females; whereas Moderate addiction was found in 10 (7.4%) male and 2 (3.7%) female students as shown in Figure 2.

There was no statistically significant association seen between male and female students to addiction of online video games (X^2 value = 0.056, p value > 0.05) as shown in Table 1.

Discussion:

Results of a study conducted by Pradeep Yarasani et al., among medical students of Katuri Medical College, Andhra Pradesh in 2018 by using Young's internet addiction scale^[1] showed a prevalence of Mild, Moderate & Severe addiction as 71.3%, 22.6% & 6.1% respectively; whereas the current study shows a lower prevalence of gaming addiction which is 55.6%, 6.4% & 0.5% respectively. A study carried out by Manish Kumar and Anwesha Mondal among students of different colleges of Kolkata in 2018,^[3] found lower prevalence of Mild addiction (29%) and higher prevalence of Moderate



Figure 1: Distribution of study participants according to severity of addiction (n=189)

Figure 2: Gender wise distribution of gaming addiction (n = 135 for male; n = 54 for female)



Table 1: Association of gaming addiction with gender

Addiction	Male n (%)	Female n (%)	Total n (%)
No Addiction	50 (37.03)	21 (38.89)	71 (37.57)
With Addiction	85 (62.97)	33 (61.11)	118 (62.43)
Total	135 (100)	54 (100)	189 (100)

and Severe addiction (31.5% & 39.5%) as compared to the current study. Results of a systematic review of the literature by S. Mihara et al.,^[4] showed a higher prevalence of Severe addiction in the total sample ranging from 0.7% to 27.5% as compared to the current study.

In the current study, there was no statistically significant association seen between male and

female students to addiction of online video games; which is in contrast to study conducted by Pradeep Yarasani et al.,^[1] which showed significant association. The results of study conducted by Jia-Rong Sheng et al., among students of seventh, eighth, and ninth grades of a junior high school in China in 2019 using Mobile Game Addiction scale^[8] showed that significant gender differences existed considering the relationship between mobile game addiction and social anxiety. Male adolescents who used mobile game additively reported higher levels of social anxiety, depression, and loneliness, compared to female adolescents.

Conclusion and Recommendations:

The study found that almost two third of the 1st year medical students were addicted to online video games; appropriate preventive and interventional strategies need to be developed to encourage rational use of internet for online video games in order to protect the physical and mental health of the students. This can be implemented as part of a month long foundation program under new Competency-Based-Medical-Education (CBME) curriculum for under graduates.

Declaration:

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Conflict of Interest: Nil

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Seroprevalence of SARS Cov 2 Immunoglobulin among First Year Medical Students in a Tertiary Care Hospital of Odisha: A Cross-Sectional Study

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Abstract:

Introduction: COVID-19 caused by SARS coronavirus two has halted life across the globe since its emergence in December 2019. Most of the infected persons are asymptomatic or have mild symptoms. Serosurvey is vital for the estimation of the burden of infection. In this context, our study objective is to estimate the Seroprevalence of SARS CoV 2 IgG among the first-year medical students after the first wave in February 2021. **Method:** A cross-sectional study was conducted among the first-year medical students of Veer Surendra Sai Institute of Medical Sciences and Research. All the students were enrolled, and their data & serum sample was collected. Serum samples were tested for the presence of Anti-Spike IgG. Data were analyzed by using appropriate statistical tests. **Results:** The Seroprevalence of anti-SARS CoV 2 IgG was estimated to be 38.8 %. Most (82 %) of the students used the mask per recommendation. Use of mask, BMI, Contact history with COVID-19 patient, attending social gathering & previous COVID-19 were associated with Seropositivity. Regular mask use, BMI, and Previous COVID-19 were significant predictors for Seropositivity. **Conclusion:** The Seroprevalence of SARS Cov 2 after the first wave of the pandemic is less than 40 %. It calls for the proper implementation of a vaccination program with strict vigilance and surveillance to stop subsequent waves.

Keywords: COVID-19, Epidemiological Study, Medical Students, Serological Testing

Introduction:

COVID-19 is an infectious disease caused by the Novel Severe acute respiratory syndrome Coronavirus type 2 (SARS CoV2). Most patients infected with this virus are asymptomatic or experience mild flu-like symptoms.^[1] In the initial phases of the epidemic, there were limited laboratories facilities and diagnostic tools available for COVID-19.^[2] Also, as most of the cases were either asymptomatic ^[3,4] or had mild symptoms, they did not get themselves tested. Also, there were minimal testing facilities surveillance activities.^[5] Considering all this, the numbers stated above seem significantly lower than the actual COVID-19 infections. Serosurvey is an essential tool to assess the prevalence of infection, coverage of immunization, or both. A well-designed serosurvey using sufficiently sensitive and specific assays can provide information on the proportion of the population with seroprotection and the susceptible proportion.^[6]

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Most estimates had placed the threshold at 60–70% of the population gaining herd immunity.^[7]

Assessment of Seropositivity for COVID-19 in a population before vaccination indicates numbers of individuals naturally infected in the past and have acquired antibodies to the virus. It can supplement the knowledge of the cumulative disease incidence.^[8] Also, the stated case fatality rate in India was low compared to developed nations, and serosurvey can decrease the Case Fatality Ration (CFR) further by indicating the actual proportions of infected people. Also, India has a relatively younger population with more than 65% people aged 35 or less, contributing to the low case fatality rate.^[9]

In India, four rounds of national serosurveys have been completed by ICMR in collaboration with state governments & other partners on May-June, August-September, December- January, and 4th on June July 2021. Overall Sero-prevalence for immunoglobulin for SARS CoV 2 was 0.7 %, 6.6%, 24.1% and 67.6% respectively. [10-13] However, it is worth mentioning that the fourth round took place after the national COVID-19 vaccination program was launched, and so not a true indicator of Community infection. Most of these serosurveys in India and worldwide were undertaken at the community level. Limited studies are available in institutional groups or close settings. In this context, our study objective is to estimate the Seroprevalence of SARS CoV2 antibodies among the first-year MBBS students of Veer Surendra Sai Institute of Medical Sciences And Research, Burla, Just prior to the COVID-19 Vaccination schedule, which is likely to give the infection status among the student community.

Method:

This cross-sectional study was conducted among the first-year Medical students in Odisha in Veer Surendra Sai Institute of Medical Science And Research, Burla, Sambalpur. The study was conducted in February 2021. All the students of the First-year batch were enrolled as participants (n=200)

The data were recorded electronically using Epicollect-5. Socio-demographic variables include age, gender, religion, addictions, use of & type of masks, contact history with COVID-19 patients, history of attending social gatherings in the past year, previous history of COVID-19, Weight, Height, Blood group. The Anti-spike IgG titer of the participants was the outcome variable.

Use of mask- Using masks all the time during interaction with outsiders and while attending social gatherings was denoted as always. Rest all were categorized as intermittent users. Mask used predominantly during interaction were noted as N-95, Triple Layer, or Cloth mask. Contact was defined as interaction for more than 15 minutes at 2 meters or less/ inhabiting with a positive case in the same room.^[14] Weight was measured with a standardized spring weighing machine. Stadiometerwas used for Height. BMI was calculated using the Quetelet index.

A three ml blood sample was collected using a 5 ml syringe by Laboratory technicians with venipuncture and transferred to vacutainers. The samples were then centrifuged at 3000 rpm & separated serum was transferred to a cryogenic vial (2ml) and was stored at -20 0Celcius. The samples were transported maintaining a cold chain (2-800c) to the serology laboratory for Antibody testing and analysis. The tests were carried out for quantitative detection for the presence of antibodies against spike protein of COVID-19 using Electrochemiluminescence immunoassay (ECLIA) based technique, which is based on the principle of doubleantigen sandwich assay and provides the result within 20 minutes.^[15] The analyzer automatically calculates the cut-off based on ACOV2 Cal1 and ACOV2 Cal2. The sensitivity and specificity of this test are 98 % & 99%, respectively.^[15]

Data were entered into Microsoft Excel and checked for completeness & were analyzed in SPSS

version 25 using appropriate statistical tests. The regression plot was done using Sigmaplot version 14. For central tendency & dispersion, mean and confidence intervals were used. Cross tab was performed to calculate the χ 2, odds ratio, and p-value. Variable with p-value less than 0.2 were analyzed by Logistic regression by Enter method. There were no missing data.

Results:

A total of 200 students participated in the study, but the responses of 196 students were analyzed after checking for completeness of data. Out of all the students, 76(38.8%) had tested positive for anti-Spike Immunoglobulin.

Of all, 72(36.7%) were female, and 124(63.3%) were male. Among females, 25(34.7%) and Males 51(41.1%) were found to have positive Antibody titer against SARS Cov 2, which is not found significantly different. (x2-0.788, p-0.375)

Among the students, 45(22.9%), 9(4.6%), 77(39.3%), 65(33.2%) belonged to Group A, AB, B, O blood groups, respectively. Eighteen, 3, 28, 27 with blood group A, AB, B, O blood groups were detected having antibodies against COVID-19, respectively, and were not found significantly different. (x^2 -0.624, p-0.891)

Out of 196 participants, 72(36.7%) were found to have attended social gatherings within the last year (i.e., after the occurrence of COVID-19 in India).

Among the students, 161 (82.1%) used masks regularly, and the rest used them intermittently. Out of the 56 (34.7%) regular users & 20 (57.1%) intermittent users were found to have positive antibody titer and were found to be significantly different. (x^2 -6.055, p-0.014). Of the students, 116, 40, 28 were using Cloth Mask, N95, and Triple layer masks, respectively. Out of the above 46(60.5%), 11(14.5%), 12(15.8%) were found to have positive antibody titer, and the difference was not significant. (x^2 - 4.244, p - 0.236) About 11 of the participants were diagnosed with COVID-19 last year with the RTPCR test. Eight of them had positive antibody titer, and three were non-reactive. Previous COVID-19 infection was significantly associated with Seropositivity. (x^2 -5.659, p-0.017)

Out of 196 participants, 66(33.6%) were found to have some close contact with COVID-19 patients within the last year. Statistically significant (x^2 -19.214, p-0.0001)30 (45.4%) association was found with contact history compared to students without any contact history.

Variables with a p-value less than 0.2 were analyzed using the stepwise logistic regression method. It was found that the use of mask was negatively associated with positive antibody titer, and the association was statistically significant with an Adjusted Odds Ratio of 0.375 and p-value of 0.014. Past COVID-19 infection was positively associated with seroconversion with statistically significant measures of association, AOR = 4.896 and p = 0.027. Higher BMI (=>25) was also significantly associated with positive antibody titer, AOR = 1.876, p = 0.049. Attending social gatherings and contact with COVID-19 patients was also positively associated with seroconversion; however, the association was insignificant.(Table 2)

Discussion:

The overall Seroprevalence of the COVID-19 antibody was 38.8 %. Out of the national serosurveys, the third round was done in December 2020 and the fourth in June-July 2021. Study results are in between these two estimates. However, the estimates are significantly lower than the findings of another serosurvey in Odisha.^[16,17] The reason may be the transient nature of anti-COVID-19 antibodies, as postulated by Naushin et al.^[18] that there is a presence in about 20% of the seropositive people decline of antibodies after five to six month. Also, the peak of the first wave in Odisha was in September, and it gradually declined to baseline in January 2021.^[19]

In the present study, about 82.1 % were always using the mask as per recommendation, which is

Sl. No	Parameter		Negative (%)	Positive (%)	Total (%)	Chi-square & p value
1	Condon	Female	47(65.3)	25(34.7)	72(36.7)	0.788,
	Gender	Male	73(58.9)	51(41.1)	124(63.3)	p=0.375
		Underweight	9(60)	6(40)	15(7.7)	
2	DMI	Normal	76(67.3)	37(32.7)	113(57.8)	6.486,
	DIMII	Overweight	31(55.4)	25(44.6)	56(28.4)	p=0.90
		Obese	4(33.3)	8(66.6)	12(6.1)	
2	Residence during	Only Home	76(59.8)	51(40.2)	127(64.8)	0.290,
3	last one year	Home & Hostel	44(63.8)	25(36.2)	69(35.2)	p=0.590
	Attending social	No	81(65.3)	43(34.7)	124(63.3)	2.388,
4	gathering last One year	Yes	39(54.2)	33(45.8)	72(36.7)	p=0.122
_		Intermittent	15(42.9)	20(57.1)	35(17.9)	6.055,
5	USE OI MASK	Always	105(65.2)	56(34.8)	161(82.1)	p=0.014
		N-95	32(80)	8(20)	40(20.4)	
	Type of	Surgical	15(53.6)	13(46.4)	28(14.3)	7.588,
0	Mask used	Cloth	66(56.9)	50(43.1)	116(59.2)	p=0.055
		Mix	7(58.3)	5(41.7)	12(6.1)	
7	Contact with	No	84(64.6)	46(35.4)	130(66.3)	1.870,
'	COVID-19 patients	Yes	36(54.5)	30(45.5)	66(33.7)	0.171
0	Whether suffered from	Yes	3(27.3)	8(72.7)	11(5.6)	5.659,
ð	COVID-19 in last one year	No	117(63.2)	68(36.8)	185(94.4)	p=0.017
	Total		120(61.2)	76(38.8)	196(100)	

Table 1: Characteristics of Participants (n = 196)

Table 2: Logistic Regression analysis of Risk factors and Positive Antibody status (n = 196)

Risk factor (% with positive antibody)	Unadjusted odds ratio (95% C.I)	Adjusted Odds ratio(95% C.I)	p-value
Use of mask Intermittent use (57.1%) Always use (34.8%)	0.40(0.19,0.842)	0.375 (0.171, 0 .818)	0.014
COVID 19 infection last year No(36.85) Yes (72.7%)	4.588(1.177,17.879)	4.896 (1.198 , 20.010)	0.027
BMI <25(33.6%) ≥25 (48.5%)	1.864(1.022,3.398)	1.876 (1.003 , 3.508)	0.049
Attending social gathering No(34.7%) Yes (45.8%)	1.594(0.881,2.884)	1.205 (0.627 , 2.316)	0.576
Contact with COVID 19 patient No (35.4%) Yes (45.5%)	1.522(0.832,2.782)	1.431 (0.747 , 2.742)	0.280



Figure 1: Regression Plot Showing Association of Variables with Seropostivity

comparable with the findings of Mondal et al.^[20] Most were wearing Cloth masks (58%) in our study, compared to N95 Mask in the findings by Mondal et al., which can be explained by the fact that our participants are students, and most may not afford N95 masks. Regular usage of the mask was negatively associated with Seropositivity, but the type of mask used was not significantly affecting Seropositivity. This finding calls for more focus on the regular use of masks irrespective of mask type.

In the present study, we found no difference in Seropositivity with the type of accommodation (home, hostel, both) in contrast to the study by Kartikeyan et al.^[21] which found significantly higher infection rates among day scholars (residing inhome), which might be explained by the fact that our local district is relatively less affected in this COVID 19 pandemic. The authors did not find any significant association.

Some studies have indicated that males have a higher risk of infection.^[10,18,22] However, the authors did not find any significant difference concerning the gender of the participants, and this is in line with the

other studies.^[11,12,16,19,20] There was no significant difference in Seroprevalence among different Blood groups, which was in contrast to many studies.^[19,24]

Nearly one-third of diagnosed cases did not have detectable antibodies, similar to Mondal et al.^[20] ICMR third round serosurvey had found it to be 46 % and Kartikeyan et al. at 11%. ^[12,21] Nearly 46% with contact history with a confirmed COVID-19 patients had antibodies, and these results are higher than the results of other studies. ^[12,22]

On multivariate logistic regression, regular mask use, previous history of infection, and BMI were independent predictors for seroconversion. In high-risk settings, regular usage of masks is significantly protected against the acquisition of COVID 19 infection. Contact with COVID 19 patients was not a significant predictor, in contrast to the study by T Elizabeth et al.^[24]

Conclusion:

About 38% of the students enrolled in our study had developed antibodies against SARS CoV 2, which is not at herd protection level but will soon reach there with the beginning of vaccination. Non-

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responders indicate to transient nature of the antibody, and it might pave the way for successive waves of infection. Adherence to regular use of the mask is an invaluable tool in our fight against COVID-19& most students are practicing it.

Limitation:

The small sample size is a limitation of our study. However, the 1st year students have been chosen as they have not been exposed to clinical duty, and the prevalence can give a generalized view of the student's community.

Declaration:

Funding: Government of Odisha

Conflict of Interest: Nil

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Burnout Syndrome among Healthcare Providers during COVID-19 Pandemic in Rural Tamil Nadu, South India: A Cross-Sectional Study

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Abstract:

Introduction: The 2019 Coronavirus disease (COVID-19) pandemic has been a serious global threat with numerous researches indicating that frontline healthcare personnel involved in its management and diagnosis are at risk of experiencing psychological disturbances and deteriorating mental health. By definition, "burnout is a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed". Burnout has been associated with increased mortality and morbidity. **Objective:** To estimate the prevalence of burnout syndrome and to determine the associated factors among healthcare providers in rural Tamilnadu during the COVID-19 pandemic. Method: A cross-sectional study was done among 120 healthcare providers from Sree Mookambika Institute of Medical Sciences, Tamil Nadu during July 2021. Participants selected by convenient sampling technique were given pre-tested Maslach Burnout Inventory- Human Services Survey (MBI-HSS) questionnaire. Data were entered in MS Excel 2019 and analysis was done in SPSS v26.0. Descriptive statistics and Chi-square tests were applied. Results: Mean age of the participants was 25.48±4.66 years. Among them, 46(38.3%) reported emotional exhaustion, 42(35%) depersonalization and 87(72.5%) reported a lower sense of personal accomplishment. The years of professional experience and the number of working hours per day were associated with emotional exhaustion and depersonalization (p<0.05). The different professional categories showed a significant association with Emotional Exhaustion (χ^2 =20.888,df=6, p=0.002) and Depersonalization (χ^2 =23.055,df=6. p=0.001) with high Burnout among doctors and nurses. **Conclusion:** This study highlights the importance of addressing burnout among healthcare personnel. The issues should be prioritized by authorities to develop appropriate interventions.

Keywords: Burnout, Healthcare personnel, Pandemic, Psychological

Introduction:

In Wuhan, Hubei Province, China, a novel coronavirus known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) was identified as the cause of severe viral pneumonia in December 2019.^[1] On February 11, 2020, this virus

was declared a global pandemic.^[2] According to research, frontline healthcare workers who are involved in the management and diagnosis of COVID-19 are at risk of developing psychiatric disorders and having their mental health deteriorate.^[3] This could be due to a number of factors, including a lack of personal protective

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equipment, a scarcity of appropriate medications, the risk of infecting family members, expectations of insufficient support, and the dread of getting the virus. These circumstances, together with the financial challenges that physicians face in many countries, put healthcare personnel under a lot of stress, jeopardising their mental health.^[4] Several studies have found a link between mental health problems and the COVID-19 pandemic, with increased rates of anxiety, depression, and insomnia.^[3] However, there is little data available on physician burnout during the pandemic.

Burnout is a psychosocial syndrome. By definition, "it is a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed".^[5] It involves feelings of emotional exhaustion, depersonalization and diminished personal accomplishment at work. Emotional exhaustion is a situation where, owing to lack of energy, workers perceive they are no longer able to participate on an emotional level. Depersonalization is characterised by the development of unfavourable attitudes and feelings against others for whom labour is performed, to the point where they are blamed for the subject's own issues. Diminished personal accomplishment is a propensity among professionals to place a low value on their own ability to complete activities and engage with the people for whom they are performed, as well as to be unhappy or unsatisfied with the outcomes.^[6] According to research, physicians are at a higher risk of burnout because they are exposed to emotional stress at a higher degree than most other occupations. Additionally, burnout has been linked to decreasing productivity and job satisfaction among physicians.^[7] As a consequence, irritability and dissatisfaction may significantly affect an individual's sense of well-being and willingness to fully function at work, compromising physicians' ability to care for patients. Physician burnout has also been associated to a higher likelihood of medical errors, which has a negative impact on patient outcomes. Burnout has been linked to a higher risk of

suicide and higher levels of depression, which is concerning. The illness has also been connected to physiological difficulties such as an increased risk of cardiovascular disease and an increase in inflammation biomarkers.^[8] The present research study has been planned, assuming that healthcare workers are at greater risk for burnout syndrome and lower quality of life during the COVID-19 pandemic.

Objectives:

- 1. To estimate the prevalence of burnout syndrome among healthcare providers in rural Tamil Nadu during the COVID-19 pandemic.
- 2. To determine the factors associated with burnout syndrome among the study participants.

Method:

A cross-sectional study was done among healthcare providers of various capacities such as interns, medical officers, general practitioners, consultants, specialists, dentists, nurses and lab technicians working invarious Medical institutes in Kanyakumari, Tamil Nadu from June 01 to July 26, 2021. A valid and reliable pre-tested, selfadministered questionnaire which included questions on background information and the Maslach Burnout Inventory (MBI) designed for professionals in the human services called the MBI-Human Services Survey (MBI-HSS). The MBI-HSS questionnaire comprised 22 items regrouped into 3 subscales: emotional exhaustion (EE; nine items), depersonalization (DP; five items), and personal accomplishment (PA; eight items). Each item was answered on a 7-point Likert scale, based on its frequency from zero (never) to six (always). The Emotional Exhaustion subscale (items 1, 2, 3, 6, 8, 13, 14, 16, and 20) measures sensations of being emotionally overworked and exhausted. The depersonalization subscale (items 5, 10, 11, 15, and 22) assesses an impersonal and unfeeling attitude toward the people who receive one's service, care, or treatment. The personal accomplishment subscale (items 4, 7, 9, 12, 17, 18, 19, and 21) evaluates feelings

of competence and success in one's work with people. AnEE score of 0 to 16 we reconsidered low, 17 to 26 moderate and 27 or more were considered high for burnout. A DP score of 0 to 6 were considered low, 7 to 12 moderate and 13 or more were considered high for burnout. A PA score of 0 to 31 were considered high, 32 to 38 were considered moderate and 39 or more were considered low for burnout.

Sample size calculation : The sample size was calculated using the formula, $n=Z^2(1-\alpha/2)pq/d^2$ based on the proportion that scored high on the emotional exhaustion subscale in a study done by Deepak Langade et al which was 45.02% with a relative precision of 20%.^[9] Sample size (n)=120.

Convenient sampling technique was used. Healthcare personnel working during the period of data collection and willing to participate were included in the study. Those responses submitted with an incomplete question form or with missing data were excluded from the study. Informed written consent was obtained from those who agreed to complete the questionnaire. The questionnaire was given to the study participants in-person or via personal communication platforms like e-mail depending upon their availability. The completed questionnaire was collected back after 48 hours and was checked for missing entries. The responses were coded and the data were tabulated in Microsoft Excel 2019. Data were analyzed using IBM SPSS Statistics Trial version 26.0. The distribution of the responses for each variable was examined using frequencies and percentages. Descriptive statistics were presented for the scores of questionnaire domains in the subgroups based on the age, gender, category of health personnel and work experience. Mean scores were calculated for the individual subscales of MBI-HSS to find out the prevalence of burnout levels in each of these components. Approval of the institutional ethics committee was obtained for the study.

Results:

Out of the total 120 participants, 23.3% (n = 28) were males, 76.7% (n = 92) were females. Among total, 31 (25.8%) worked in the Government set up whereas 89 (74.2%) in private organizations. Among them, 44% were medical doctors, 26.7% were nurses, 16.7% were dentists and the remaining 12.5% were lab technicians. The demographic details of the participants have been shown in Table 1.

The overall prevalence of Burnout was 48.3%. 38.3% (n=46) scored high on Emotional Exhaustion d o m a i n, 35% (n = 42) s c o r e d h i g h o n Depersonalization domain and 72.5%(n=87) scored low on Personal Accomplishment domain indicating high degree of burnout among them. (Figure 1)

The mean EE score was 22.9±11.6 and 38.3% of HCWs demonstrated high EE. The mean DP score was 11.2±6.4 and 35% demonstrated high DP. The mean PA score was 25±10.1 and 72.5% demonstrated low PA. The mean EE, DP and PA scored by the participants are shown in Figure 2.

Males exhibited higher Emotional Exhaustion than females. For the MBI-HSS personal accomplishment domain, out of the 120 respondents, 72.5% (n = 87) had low scores where an increased number of medical doctors as compared to the others exhibited high Emotional Exhaustion (p=0.002, χ^2 =20.888, df=6) and Depersonalization (p=0.001, χ^2 =23.055, df=6) scores, showing a significant association. There was statistically significant association between low Personal Accomplishment scores and age less than 30 years (χ^2 =9.922, df=2, p=0.007) and also with gender (χ^2 =7.099, df=2, p=0.029) of the study group. Table 2 shows a list of variables and their association with higher EE, higher DP, lower PA and overall Burnout.

Discussion:

The present study was aimed to estimate the degree of burnout among healthcare personnel from various fields with a wide range of clinical experience

Demographic Characteristics	Variables	Frequency (n)	Percentage (%)	
Condon	Male	28	23.3	
Gender	Female	92	76.7	
Work Organization	Government	31	25.8	
work organization	Private	89	74.2	
	General physicians/MO	38	31.6	
	Interns	15	12.5	
Occupation	Nurse	32	26.7	
	Dentist	20	16.7	
	Lab technician	15	12.5	
	Unmarried/Divorced	84	70.0	
Marital status	Married	36	30.0	
Living arrangements	With family	93	77.5	
	Alone	27	22.5	
	Less than 15 years	18	15.0	
Age of child, if any	More than 15 years	3	2.5	
	No children/Not applicable	99	82.5	
	Less than 6 hours	15	12.5	
Hours per day at work	6-10 hours	78	65.0	
	More than 10 hours	27	22.5	
	More than 10yrs	7	5.8	
Years of experience	5-10 yrs	15	12.5	
	Less than 5 yrs	98	81.7	

Table 1: Demographic details of respondents (n=120)





Figure 2: Box plot showing the mean scores in each MBI-HSS domain



Table 2: Factors associated with thedomains of MBI-HSS									
	Emotional exhaustion (EE)		Depersonalization (DP)			Personal accomplishment (PA)			
Variable	High n (%)	Mod n (%)	Low n (%)	High n (%)	Mod n (%)	Low n (%)	High n (%)	Mod n (%)	Low n (%)
Gender	Gender								
Male	11(39.3)	6 (21.4)	11(39.3)	11(39.3)	11(39.3)	6(21.4)	4(14.3)	7 (25)	17(60.7)
Female	35 (38)	29 (31.5)	28(30.4)	31(33.7)	35 (38)	26(28.3)	2 (2.2)	20(21.7)	70(76.1)
	p-value=0.528		p-value=0.750		p-value=0.029*				
Age group									
Less than 30 years	42(39.6)	31 (29.2)	33(31.1)	38(35.8)	42(39.6)	26(24.5)	3 (2.8)	23(21.7)	80(75.5)
More than 30 years	4 (28.6)	4 (28.6)	6 (42.9)	4 (28.6)	4 (28.6)	6 (42.9)	3(21.4)	4 (28.6)	7 (50)
	p-	p-value=0.632		p-value=0.343		p-value=0.007*			
Years of clinical experience									
>10 years	3(42.9)	2(28.6)	2(28.6)	2 (28.6)	3 (42.9)	2 (28.6)	2(28.6)	3 (42.9)	2 (28.6)
5-10 years	4(26.7)	7 (46.7)	4 (26.7)	4 (26.7)	7 (46.7)	4 (26.7)	1 (6.7)	4 (26.7)	10(66.7)
<5 years	39(39.8)	26 (26.5)	33(33.7)	36(36.7)	36(36.7)	26(26.5)	3 (3.1)	21(21.4)	74(75.5)
	p-value=0.615		p-value=0.932		p-value=0.042*				
Health profession									
Medical doctors	27(50.9)	15 (28.3)	11(20.8)	21(39.6)	26(49.1)	6 (11.3)	1 (1.9)	11(20.8)	41(77.4)
Dentists	4 (20)	2 (10)	14 (70)	4 (20)	3 (15)	13 (65)	2 (10)	4 (20)	14 (70)
Nurse Lab	12(37.5)	12 (37.5)	8 (25)	10(31.3)	13(40.6)	9 (28.1)	1 (3.1)	10(31.3)	21(65.6)
Technicians	3 (20)	6 (40)	6 (40)	7 (46.6)	4 (26.7)	4 (26.7)	2(13.3)	2 (13.3)	11(73.3)
	p-value=0.002*		p-value=0.001*		p-value=0.368				

Table 2. Factors associated with the domains of MPL

*Statistically significant (Chi-square test)

in rural Tamil Nadu. It showedthat 38.3% (n = 46) and 35% (n = 42) of the participants scored high on the Emotional Exhaustion and Depersonalization scales respectively, 72.5% (n = 87) scored low on the Personal Accomplishment scale. There was a substantial positive relationship between high burnout prevalence and several health professions. The high prevalence of burnout among Indian medical practitioners is comparable to the findings of other nations' studies on burnout among medical practitioners.^[10-12]

The high percentages of Emotional Exhaustion found in this study are similar to other studies conducted on oncologists in the United States, which found that 38.3 percent of them were emotionally exhausted.^[10] The levels of burnout in this study are higher than those observed in European doctor studies. Burnout is a widespread concern among family doctors in Europe, according to the European General Practice Research Network (EGPRN), with high levels impacting two-thirds of the respondents in the survey. Overall, 43% of participants reported high levels of Emotional Exhaustion, while 35% reported low, Depersonalization was reported by 35% of respondents, and low feelings of personal accomplishment were reported by 32%, which is lower than the current study's findings.^[11] The current study found a higher prevalence of burnout among females than men, which is consistent with the findings of French intensivists who found a higher frequency of burnout among females than males.^[12] Females in India are more likely to experience significant burnout, which is likely due to culturally higher demands in household situations, resulting in a mismatch in their work-life balance.

There also seems to be a rise in the Personal Accomplishment burnout levels with increase in the respondents' age and work experience. This finding is similar to earlier findings where there was a rise in burnout with an increase in experience.^[13] High levels of Emotional Exhaustion was seen in a very low proportion (20%) of dentists in our study which was similar to another study done among Dutch dental practitioners which was 2.5%.^[14] This may indicate that burnout is prevalent not only among medical practitioners, but also other professionals across the health care system in India and needs urgent attention. High levels of burnout are probably seen due to the poor doctor-patient ratio in India. The intense patient workload with limited doctors results in long working hours. This leaves them with minimal time for family life and recreation. Also, the medical fees here in India are lower than the other developed countries. These multiple factors have led to intense dissatisfaction among the medical community, which is a cause of great concern.

Clinical burnout is linked to a range of negative consequences. Burnout is a psycho social occupational health condition that is one of the most common work-related disorders in today's culture. This can cause somatic symptoms such as interpersonal issues, sleeplessness, irritation, and suicidal ideation, and is similar to the psychological mood disorder dysthymia.^[15] Burnout has also been linked to a number of cardiovascular disease risk factors, including excessive cholesterol, glucose, triglycerides, uric acid, and, to a lesser extent. Burnout plus listlessness scores were positively associated with glucose and adversely associated with diastolic blood pressure.^[16] Burnout has also been connected to an increased risk of developing type 2 diabetes.^[17] The key to effectively dealing with this disease is early discovery and treatment.^[9]

However, our study is subjected to few shortcomings such as limited sample size and generalis ability. Since the data collected is subjective and based on a cross sectional design, it is difficult to make any causal inferences. Further studies will help to get more accurate results and confirm the findings of this study.

Conclusion:

Nearly half (48.3%) of the study population showed a high degree of burnout where theEmotional Exhaustion and Depersonalization domains were significantly associated with category of health personnel and the Personal Accomplishment domain with age, gender and the years of clinical experience. Burnout may be minimized by an institutional approach with support from medical bodies and organisations maintaining a good work-life balance, utilization of better ergonomic practices and stress management at the workplace.

Declaration:

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Conflict of Interest: Nil

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Needs Assessment study for a common Post-Graduate Curriculum in Community Medicine Shobha Misra

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What problem was addressed ? A curriculum defines the learning that is expected to take place during a course or programme of study in terms of knowledge, skills and attitudes. The written and published curriculum is the official or formal curriculum. Curriculum or course needs to be monitored and evaluated to ensure that it is working as planned and also to identify areas or improvement. This study was conducted with the objectives to: identify the need for a common Post-Graduate Curriculum; enlist the must know, nice to know and desired to know areas and; enlist the areas for teaching and assessment in Community Medicine in Medical Colleges of a state in India.

What was tried ? This was a cross-sectional study through administration of a semi-structured online questionnaire conducted at a Medical College located in India. Before formulating the questionnaire, a Focus Group Discussion with post graduate (PG) students of the College was conducted using a guideline. Based on their responses and peer review, the questionnaire was designed. The same was mailed to 100 PG students and 80 Teachers of Community Medicine from six Government and two private Medical Colleges of the state. The questionnaire was based on the implemented curriculum, to seek their opinions regarding the; qualities of the implemented curriculum and questions requesting classification of syllabus into Must to Know, Nice to Know and Desirable to Know. For quantitative questions, a five-point agreement scale was used. Quantitative questionnaire data was analyzed with MS Excel Sheet. Open-ended suggestions were analyzed by coding comparable comments expressed by two or more respondents as key points. The study was approved by the Institutional Ethics Committee; EC registration no: ECR/85/Inst/GJ/2013 dated 06/01/15.

What lessons were learnt ? Majority of the respondents felt that there were no defined learning outcomes, teaching-learning and assessment methods. The curriculum lacked clarity and linkages with professional development and was not Competency-based. All of them agreed that there was a need of introducing formative assessment during PG course as feedback for learning. The study concluded that there were major weaknesses in the PG Curriculum in Community Medicine in terms of; it being more knowledge based rather than skill based; non-clarity regarding the core and non-core areas; assessment was objective and teaching objectives were not in alignment; professionally ill-developed and less confident for jobs beyond medical colleges and; its implementation in all the colleges was very much variable. Also that, there were problems in posting PGs at various organizations / NGOs / Institutions which hinders their learning experience and all faculties were not comfortable with teaching of all topics. In a teacher's own words to an openended question,"I wondered currently, what a PG student of community medicine does for 3 entire years?".There is a definite need of defining

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curriculum for three different years. Another put it like this, "There is no formal formative assessment, except feedback given during presentation". However, most of them agreed that; the curriculum helps students to utilize basic statistical analysis, material resources were available and students were being supported in independent learning. The main problem encountered during the study was that, despite of three reminders and circulation of the questionnaire through a letter from the professional body of Community Medicine at state level only 40% forms were received back.

What Next : It is planned to design a competencybased curriculum within the conventional curriculum in Community Medicine teaching and training of post graduates so that they could efficiently play their roles as Community Physician, Public Health Specialist, Health Manager, Faculty, Researcher and Occupational Physician. This structured curriculum would first be implemented in the department with a possibility to be scaled at state level.

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