A National Journal of Indian Association of Preventive and Social Medicine

HEALTHLINE

pISSN 2229-337X / eISSN 2320-1525

VOLUME : 14 ISSUE : 3 JULY - SEPTEMBER 2023

For more details visit : www.healthlinejournal.org

HEALTHLINE JOURNAL

A National Journal of

Indian Association of Preventive and Social Medicine managed by IAPSM-GC

Volume : 14 Issue : 3 (July - September 2023)

Editorial Board

Correspondence

Editor in Chief, Healthline Journal, Community Medicine Department, GCS Medical College, Hospital and Research Center, Opp. DRM Office, Nr. Chamunda Bridge, Naroda Road, Ahmedabad-380025, Gujarat. Telephone: 07966048000 Ext. No. 8351, Email: editorhealthline@gmail.com.

Disclaimer

Healthline journal is indexed with

Index Copernicus, DOAJ, OPENJGATE, CABI, Index Medicus-SEAR

HEALTHLINE JOURNAL

A National Journal of
Indian Association of Preventive and Social Medicine managed by IAPSM-GC
Volume : 14 Issue : 3 (July - September 2023)

INDEX

Content | **Page No.**

HEALTHLINE JOURNAL

A National Journal of

Indian Association of Preventive and Social Medicine managed by IAPSM-GC

Volume : 14 Issue : 3 (July - September 2023)

INDEX

Should Every Medical College have a Dedicated Vaccination Clinic?

Annarao Kulkarni[1], Narayana Holla[2]

[1]Professor and Head, Community Medicine Department, East Point College of Medical Sciences and Research Centre, Bangalore (National President Elect IAPSM)

[2]Professor Emeritus, Community Medicine Department, KVG Medical College and Hospital, Sullia, Dakshinakannada

Correspondence : Dr Annarao Kulkarni, Email: shrikulk55@yahoo.co.in

Vaccination has been proven to be one of the most effective health interventions available worldwide to prevent morbidity and mortally due to vaccine preventable diseases (VPDS) Global vaccination services had good coverage during 2022 yet 20.5 million children are still missing their life saving vaccines.[1] Establishing a dedicated vaccination clinic especially in the private institutions could be one solution to further improve childhood as well as adult vaccination coverage. A dedicated vaccination clinic or centre is a specified premises within the institution for strict adherence to the "Rights" to be observed while administering vaccines to individuals for conferring both specific and extra-specific protection, to promote both innate and adaptive immunity for building strong population immunity. These clinics play a crucial role in public health efforts to control / eliminate / eradicate vaccine preventable diseases [VPDs]. They also provide a centralized and organized location for quality vaccination services. Their impact extends beyond individual health, contributing to the well-being of societies and global health efforts.

Key features of dedicated vaccination clinic:[2,3]

- Vaccine administration: The primary function of a dedicated vaccination clinic is to administer vaccines to the beneficiaries from new born to geriatric age [life cycle approach]
- Vaccine procurement from the attached planning unit & storage in the proper cold chain: Proper storage of vaccines is crucial to maintain their effectiveness. These clinics are equipped with the necessary refrigeration and storage facilities to keep vaccines at the correct temperature.
- Health education: As these clinics are staffed with knowledgeable trained personnel, beneficiaries can elucidate their vaccination related queries and have a smooth uneventful vaccination experience. Appropriate health education and counselling regarding importance of vaccination and the expected Adverse-events will be provided by the staff. In teaching institutions, it is the nodal point for rolling out competent and confident health care service providers from nursing students to post graduate Medical Students through training & education.
- Accessibility: Apart from clinics at the facilities, EXCLUSIVE vaccination clinics can also be strategically located in easily accessible areas especially during public health emergencies (e.g-COVID-19 pandemic).
- Monitoring and Reporting: After vaccination, vaccinees will be observed for a short period of time to detect any immediate Adverse Events Following Immunization [AEFI]. AEFI if occurs; institution will follow AEFI protocol.

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Kulkarni A, Holla N. Should Every Medical College have a Dedicated Vaccination Clinic? Healthline. 2023; 14 (3): 171-173
	DOI : 10.51957/Healthline_ 558_2023	

Medical college and dedicated vaccination clinics:

Whether every medical college should have a dedicated vaccination clinic depends on Several factors.

- **Resource Availability:**[4] By default, teaching institutions have to mandatorily shoulder the responsibility of rolling-out competent and confident health care service providers. It necessitates proper premises, training materials [RI Handbook for MO's, COVID vaccination guidelines], exclusively trained staff, proper infrastructure and vaccine storage facilities. A medical college should assess its ability to allocate resources to support such a clinic effectively.
- **Regulatory and Licensing Requirements:**[5] Medical colleges that meet the prescribed standards of local and national healthcare regulations can operate the vaccination clinic.
- **Institutes Educational Objectives:**[6] Having a dedicated vaccination clinic in Medical College campus can be beneficial for practical training and hands-on experience in vaccine administration and immunization programs.
- **Community engagement:**[7] For any medical college with a vision to serve the under served populations, to identify the healthcare needs in its locality and having a desire to be closely integrated with the local community, having a dedicated vaccination clinic can serve as a valuable asset.
- **Areas of interest:** Dedicated vaccination clinic will provide abundant opportunity for operational research and original research provides needy evidences for making relevant policies.

Benefits/impact of dedicated vaccination clinic:

- Routine Vaccination Services sustainably enhance "National Immunization coverage."[8]
- Disease prevention thus reducing hospitalization and treatment expenses
- Timely response to outbreaks/emergency preparedness
- Increased training for healthcare personnel in vaccination
- AEFI surveillance
- Health education and counselling for the needy
- Proper vaccine storage

Barriers in establishing a dedicated vaccination clinic:

- Vaccine hesitancy in the community due to cultural barriers[9]
- Location of the vaccination clinic itself can serve as a barrier
- Limited resources – shortage of trained health personnel or shortage in vaccine supply[10]
- Cost of vaccination

Addressing these barriers requires a multifaceted approach that includes public health campaigns, community engagement, improved healthcare infrastructure and efforts to build trust in healthcare systems. Effective communication and collaboration among healthcare providers, public health agencies, and communities are essential to overcoming these challenges and promoting vaccination.

Recommendation:

Problems in setting up a dedicated vaccination clinic should be identified by establishing an exclusive Extended Supportive Supervision system for a sustained revolution through regular visits to both private and public sectors and solution to be reinforced through regular periodic continued medical education workshops, supporting operational research for simplification and by providing timely feedback and feed forward information.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References:

1. Vaccination and immunization statistics [Internet]. 2023 [cited 2023 Sept 6]. Available from: https://data.unicef.org/topic/child-health/immunization/
2. Pre-vaccination Clinic Activities [Internet]. Centers for Disease Control and Prevention; 2022 [cited 2023 Sept 6]. Available from: https://www.cdc.gov/vaccines/hcp/admin/mass-clinic-activities/pre-clinic-activities.html
3. Post-vaccination clinic activities [Internet]. Centers for Disease Control and Prevention; 2022 [cited 2023 Sept 6]. Available from: https://www.cdc.gov/vaccines/hcp/admin/mass-clinic-activities/post-clinic-activities.html
4. Vaccination Clinic Planning Activities [Internet]. Centers for Disease Control and Prevention; 2022 [cited 2023 Sept 6]. Available from: https://www.cdc.gov/vaccines/hcp/admin/mass-clinic-activities/planning-activities.html
5. National vaccine policy book - Ministry of Health and Family Welfare [Internet]. [cited 2023 Sept 5]. Available from: https://main.mohfw.gov.in/sites/default/files/108481119000.pdf
6. Training Health Workers Improves children immunization services [Internet]. 2022 [cited 2023 Sept 6]. Available from: https://www.unicef.org/yemen/stories/training-health-workers-improves-children-immunization-services
7. Kompithra RZ, R M, Mathew LG, Verghese VP, John TJ. A High Volume, User-Friendly Immunization Clinic in Vellore, India: A Model for Urban Hospitals. JI. 2016 Mar 20;1(1):1–8.
8. De Sarro C, Papadopoli R, Cautela V, Nobile CGA, Pileggi C, Pavia M. Vaccination coverage among health-care workers: pre–post intervention study to assess impact of an on-site vaccination-dedicated clinic. Expert Review of Vaccines. 2021 Jun 3;20(6):753–9.
9. Costantino C, Caracci F, Brandi M, Bono SE, Ferro A, Sannasardo CE, et al. Determinants of vaccine hesitancy and effectiveness of vaccination counseling interventions among a sample of the general population in Palermo, Italy. Human Vaccines &Immunotherapeutics. 2020 Oct 2; 16(10):2415–21.
10. Hinman AR, Orenstein WA, Santoli JM, Rodewald LE, Cochi SL. Vaccine shortages: history, impact, and prospects for the future. Annu Rev Public Health. 2006;27:235-59.

Prevalence of Infertility and its Associated Factors among the Eligible Couples of Central Kerala

Austoria A J[1], Sobha A[2], Manjula V D[3], Binu Areekal[3]

[1]Assistant Professor, Community Medicine Department, Trichy SRM Medical College Hospital and Research Centre, Trichy, Tamilnadu, India, [2]Professor and Head, [3]Retired Professor and Head, Community Medicine Department, Government Medical College, Ernakulam, Kerala, India, [4]Professor and Head, Community Medicine Department, Government Medical College Idukki, Kerala, India

Correspondence : Dr Binu Areekal, Email:drbinu840@rediffmail.com

Abstract:

Introduction: Infertility is a personal tragedy for millions of couples world-wide and has very definite physical, psychological and social implications. **Objectives:** To find the prevalence of infertility and to explore the association between selected clinical and socio demographic factors with infertility in Arpookara Panchayat, Kottayam, Kerala. **Method:** A community based cross-sectional study was conducted among 860 eligible couplesselected using simple random sampling technique, from all the 4 subcentre areas. Sociodemographic and medical/surgical details of both male and female partner were collected by semi-structured interview schedule. The couples were said to have infertility when they had either primary or secondary infertility. Pearson Chi-square test / Fisher's Exact test was used to find the association of various factors with infertility. **Results:** The prevalence of infertility was 10.3%, with 5.6% primary infertility and 4.7% secondary infertility. Factors that were found significantly associated with infertility were couples belonging to lower socioeconomic status, joint family, women marry at age ≥35 years, diabetes mellitus in women, pelvic inflammatory diseases, uterine fibroids, polycystic ovarian syndrome, abdominal pelvic surgeries in women, varicocele, mumps in men, oligospermia, men with education level less than high school, smoking, alcohol and family history of infertility in men. **Conclusion:** One tenth of the population included in the study had infertility. Thepredictors for infertility were lower socio-economic class, number of years after marriage (5-9 years), smoking in men, oligospermia, varicocoele, mumps in men, age at marriage (≥35 years) in women, polycystic ovary syndrome, pelvic inflammatory disease and diabetes mellitus in women.

Key words : Alcoholism, Infertility, Oligospermia, PCOS, Smoking

Introduction:

The arrival of a baby into this world is celebrated and the womanhood is praised since time immemorial. Childlessness in India, where joint family system is still followed in many families, leads to comparison of couples and end up in strained relationships. In most of the cases, women are blamed for infertility and the men neither supports his spouse nor co-operates with investigations for infertility, for the fear of being criticized about his manhood. Of the various definitions put forward for infertility, World Health Organization (WHO) use the epidemiological definition for infertility to know the prevalence, i.e., Women of reproductive age (15-49 years) at risk of becoming pregnant (not pregnant, sexually active, not using contraception and not

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Austoria A J, Sobha A, Manjula V D, Binu Areekal. Prevalence of Infertility and its Associated Factors among the Eligible Couples of Central Kerala. Healthline. 2023; 14 (3): 174-182
	DOI : 10.51957/Healthline_ 532_2023	

lactating) who report trying unsuccessfully for a pregnancy for two years or more.[1]

WHO estimated that more than 186 million ever-married women of reproductive age in developing countries were affected by infertility, in developing countries, translating it into one in every four couples.[2] The WHO estimates the overall prevalence of primary infertility in India to be between 3.9 and 16.8 percent. Estimates of infertility vary widely among Indian states. Moreover, the prevalence of primary infertility has also been shown to vary across tribes and castes within the same region in India.[3]

According to District Level Household Facility Survey - 3 done in Kerala, about 11% of ever married women aged between 15-49 years in Kerala had Infertility. One in every ten ever married women have infertility, in almost all districts of Kerala.[4] There are no or only a few published studies on infertility and its risk factors in Kottayam district of Kerala, India. Hence this study was designed with the objective of estimating the prevalence of infertility and its associated factors among the eligible couples of Arpookara Panchayat, Kottayam, Kerala.

Method:

This community based cross-sectional study was carried out during June 2014 to May 2015, after the approval from Institutional Review Board (No.37/2014), in Arpookara Panchayat of Kottayam district whichis located in the central part of Kerala. According to DLHS-3 (District Level Household and Facility Survey 2007-08), prevalence of Infertility among the ever-married women aged between 15-49 years in Kerala was 11%.[4] With α error at 5% and 20% relative precision, the sample size was calculated using the formula $n= Z^2_{1-\alpha/2} pq/ d^2$, n=777. Eligible couples (currently married couple wherein the wife is in the age group of 15-49 years) who were married for 2 or more than 2 years, registered in the 4 subcentres (Villooni, Karuppa, Karipputhattu and Maniaparambu) of Arpookara panchayat as per the updated eligible couple register, were included in the study. A compiled list of eligible couples, total of 2999, from the four subcentres was used as the sampling frame and a total of 860 eligible couples were included in the study using simple random sampling technique. Couples who were staying in the study setting for duration less than 6 months and those not willing to participate in the study were excluded.

Women were interviewed at their home, and for informationon male partners, regarding socio-demographic characteristics, menarche, menstrual abnormality, marital history, sexual details, child birth, infertility investigation and treatment, comorbidities, surgical history smoking and alcoholism, exercise and family history of infertility were collected using a pre-tested semi-structured interview schedule. Socioeconomic status was assessed using Modified KuppuswamyScale 2014.[5]The couples were said to have infertility when they had either primary or secondary infertility. No investigation of any kind was done in this study to find the cause of infertility and the hospital records maintained at home was used to collect data on infertility management.

Operational Definitions:

Epidemiological definition of Infertility: Women of reproductive age (15–49 years) at risk of becoming pregnant (not pregnant, sexually active, not using contraception and not lactating) who report trying unsuccessfully for a pregnancy for two years or more.[1] In the present study, the term infertility includes both the primary infertility and secondary infertility.

Primary infertility: When a woman is unable to ever bear a child, either due to the inability to become pregnant or the inability to carry a pregnancy to a live birth she would be classified as having primary infertility. Women whose pregnancy spontaneously miscarries, or whose pregnancy results in a still born child without ever having a live birth would present with primarilyinfertility.[6]

Secondary infertility: When a woman is unable to bear a child, either due to the inability to become pregnant or the inability to carry a pregnancy to a live birth following either a previous pregnancy or a previous ability to carry a pregnancy to a live birth, she would be classified as having secondary infertility. Thus, those who repeatedly spontaneously miscarry or whose pregnancy results in a stillbirth, or following a previous pregnancy or a previous ability to do so, are then not unable to carry a pregnancy to a live birth would present as secondarily infertile.[6]

Data Analysis

Data were appropriately coded, entered in Microsoft Excel and analyzed using Statistical Package for Social Studies version 16.0. Quantitative variables were expressed as mean and standard deviation and qualitative variables were counts and percentages. Chi Square test, Fishers's Exact test and independent sample t-test were done for bivariate analysis and a p value of less than 0.05 was taken as statistically significant. Binary logistic regression was done to find the independent predictors of infertility.

Results:

Socio-demographic characteristics

Among the 860 eligible couple, the mean age of men was 40.34 ± 6.829 years and the mean age of women was 35.51 ± 6.656 years. The population consisted of 59% Hindus, 39.7% Christians and 1.4% Muslims. The literacy rate was 99.7% in men with 53.5% educated up to high school and literacy rate among women was 99.9% with 42.9% completed high school education. Employed men were involved in unskilled (32.9%) and skilled (34.5%) occupation, whereas 2/3rd women (66.7%) were unemployed. The study participants belonged to lower middle class (45.30%) followed by upper middle class (41.60%), upper lower class (12.10%) and upper class (0.90%).

Burden of Infertility

Total number of couples with infertility was 89, hence the prevalence of infertility was 10.3% with 5.6% primary infertility and 4.7% secondary infertility. For further analysis, couples with both primary and secondary infertility were considered as infertile. Among the infertile couples, 51.7% did not do any investigation to find the cause of infertility and among those who were investigated, 24.7% of infertility was due to male factor followed by female factor 13.5%, both male and female factors 4.5% and unexplained infertility (cause was not found with the investigations) constituted 5.6%.

Among the couples with infertility, majority of the women belonged to the age group of 35-39 years (27%), followed by 30-34 years (22.5%), 25-29 years (21.3%), 40-44 years (14.6%), 20-24 years (7.9%) and 45-49 years (6.7%). In men, majority belonged to the age group of 35-39 years (30.3%) followed by 40-44 years (25.8%), 30-34 years (20.2%), 45-49 years (12.4%), more than or equal to 50 years (7.9%) and 25-29 years (3.4%). Among the women with infertility, 52.8% had education up to high school certificate and 47.2% had schooling post high school certificate and in men with infertility, 73% had schooling till high school and 27% had schooling post high school. The association of education and infertility was statistically significant for men (Chi-square value 4.246, p = 0.039) but not in women (Chi-square value 1.319, p = 0.251). There was increase in prevalence of infertility with decrease in socioeconomic status, with no infertile couples in upper class, 6.7% in upper middle class, 12.1% in lower middle class and 17.3% in upper lower class (Chi-square value for trend = 12.66, p <0.001). Prevalence of infertility was more in joint family (12.6%) when compared to nuclear family (7.7%) and was found to have statistically significant association (Chi-square value = 5.551, p = 0.018). No significant association found between religion and infertility.

Menstrual and marital characteristics

The mean age at menarche in women with infertility was 13.6 ± 1.6 years and 13.7 ± 1.4 years in others, this difference in mean age at menarche was not statistically significant with independent sample T-test, t value of -0.72 and p value 0.5. The rate of infertility increased with increase in age at marriage and was found to be statistically significant. Association of menstrual and marital characteristics with infertility were described in the Table 1.

Medical history and life style characteristics

The details of past medical and surgical diseases of both the partners and their lifestyle characteristics and their association with infertility were shown in Table 2 and Table 3 respectively. Presence of diabetes mellitus, pelvic inflammatory diseases (PID), uterine fibroids, polycystic ovary syndrome (PCOS), history of abdominal pelvic surgeries in women were found to have statistically significant association. History of varicocele, mumps, oligozoospermia, smoking, alcohol and family history of infertility were found to have association in men.

Binary logistic regression analysis

The factors found associated with infertility in bivariate analysis were analyzed using binary logistic regression with infertility as dependent variable. Independent predictors of infertility found were shown in Table 4. This model had the Nagelkerke R^2 value of 0.353.

Table 1: Association of Menstrual and Marital characteristics of Women with infertility (N=860)

Variables	Infertility		Chi Square	p value
	Present n (%)	Absent n (%)		
Menstrual disorders				
Present	29 (14.9%)	165 (85.1%)	5.71	**0.017***
Absent	60 (9.0%)	606 (91.0%)		
Age at marriage (Completed years)				
≤ 19	5 (4.7%)	101 (95.3%)	26.87	**<0.001***
20 -24	35 (8.0%)	402 (92.0%)		
25 – 29	35 (12.5%)	245 (87.5%)		
30 – 34	10 (35.7%)	18 (64.3%)		
≥ 35	4 (44.4%)	5 (55.6%)		
Years of married life (Completed years)				
≤ 4	19 (14.7%)	110 (85.3%)	27.53	**<0.001***
5 – 9	39 (17.7%)	181 (82.3%)		
10 – 14	15 (8.6%)	159 (91.4%)		
≥ 15	16 (4.7%)	321 (95.3%)		

*Statistically significant with p value < 0.05

Table 2: Medical history and Lifestyle Characteristics of Women versus infertility (N=860)

Variables	Infertility		Statistical test	p value
	Present n (%)	Absent n (%)		
Diabetes Mellitus				
Present	4 (28.6%)	10 (71.4%)	Fisher's Exact test	**0.048***
Absent	85 (10.0%)	761 (90.0%)		
Thyroid disorders				
Present	14 (14.6%)	82 (85.4%)	Pearson chi-square	0.148
Absent	75 (8.8%)	689 (90.2%)	value 2.088	
PID				
Present	6 (24.0%)	19 (76.0%)	Fisher's Exact test	**0.036***
Absent	83 (9.9%)	752 (90.1%)		
Uterine fibroids				
Present	7 (25.0%)	21 (75.0%)	Fisher's Exact test	**0.019***
Absent	82 (9.9%)	750 (90.1%)		
Endometriosis				
Present	1 (14.3%)	6 (85.7%)	Fisher's Exact test	0.536
Absent	88 (10.3%)	765 (89.7%)		
PCOS				
Present	10 (32.3%)	12 (67.7%)	Fisher's Exact test	**0.001***
Absent	79 (9.5%)	750 (90.5%)		
Tuberculosis				
Present	3 (21.4%)	11 (78.6%)	Fisher's Exact test	0.169
Absent	86 (10.2%)	760 (89.8%)		
Abdominal Pelvic surgeries				
Present	3 (50%)	3(50%)	Fisher's Exact test	**0.017***
Absent	86 (10.1%)	768 (89.9%)		
BMI				
Underweight	6 (11.1%)	48 (88.9%)	Pearson chi-square	0.411
Normal weight	39 (9.3%)	381 (90.7%)	value 2.874	
Over-weight	38 (12.5%)	266 (87.5%)		
Obese	6 (7.3%)	76 (92.7%)		
Waist hip ratio				
< 0.85	35 (9.7%)	324 (90.3%)	Pearson chi-square	0.625
≥ 0.85	54 (10.8%)	447 (89.2%)	value 0.239	
Family history of infertility				
Present	4 (5.1%)	75 (94.9%)	Pearson chi-square	0.1
Absent	85 (10.9%)	696 (89.1%)	value 2.619	

Note: PID – Pelvic Inflammatory Disease, PCOS – Polycystic ovary syndrome.

*Statistically significant with p value < 0.05

Table 3: Medical and Surgical Details in Men versus Infertility (N=860)

Variables	Infertility		Statistical test
	Present n (%)	Absent n (%)	**p value**
Diabetes Mellitus			
Present	4(12.9%)	27 (87.1%)	Fisher's Exact Test
Absent	85 (10.3%	744 (89.7%)	0.552
Varicocele			
Present	5 (62.5%)	3 (37.5%)	Fisher's Exact Test
Absent	84 (9.9%)	768 (90.1%)	**<0.001***
Mumps			
Present	8 (28.6%)	20 (71.4%)	Fisher's Exact Test
Absent	81 (9.7%)	751 (90.3%)	**0.005***
Tuberculosis			
Present	2 (28.6%)	5 (71.4%)	Fisher's Exact Test
Absent	87 (10.2%)	766 (89.8%)	0.158
Oligozoospermia			
Present	11 (68.8%)	5 (31.2%)	Pearson chi-square value 59.934
Absent	78 (9.2%)	766 (90.8%)	**<0.001***
Abdominal Pelvic surgeries			
Present	3 (6.7%)	42 (93.3%)	Fisher's Exact Test
Absent	86 (10.6%)	729 (89.4%)	0.613
Smoking			
Present	56(17.02%)	273(82.98%)	Pearson chi-square value 25.5695
Absent	33 (6.2%)	498 (93.8%)	**<0.001***
Alcoholism			
Present	72 (12.4%)	510 (87.6%)	Pearson chi-square value 7.9363
Absent	17 (6.1%)	261 (93.9%)	**0.0048***
Family history of infertility			
Present	18 (17.6%)	84 (82.4%)	Pearson chi-square value 6.644
Absent	71 (9.4%)	687 (90.6%)	**0.01***

*Statistically significant with p value < 0.05

Discussion:

Among the study population, 89 couples (10.3%) had infertility (5.6% primary and 4.7% secondary infertility). When compared to the DLHS-3 Kerala [4](8.7% primary infertility and 1.8% secondary infertility), the prevalence of primary infertility was lower but secondary infertility was higher. The result was higher when compared to the studies done in West Bengal (2.04% primary infertility and 0.11% secondary infertility)[7] and Bangalore (primary infertility 4.5%)[8] and lower

Table 4: Binary logistic regression analysis of factors associated with infertility (N=860)

Independent variable	B	S.E.	p value	OR	95% CI
Socio economic status (lower middle class)	0.669	0.194	0.001	1.952	1.334 – 2.856
Age at marriage in women (≥35 years)	0.584	0.165	0.001	1.730	1.253 – 2.389
Number of years after marriage (5 – 9 years)	0.453	0.142	0.001	1.573	1.191 – 2.078
Oligozoospermia	2.562	0.649	< 0.0001	12.958	3.633 – 46.219
Mumps in men	1.258	0.514	0.014	3.518	1.284 – 9.636
Varicocoele	3.567	0.821	< 0.0001	35.399	7.080 – 177
Smoking in men	1.072	0.298	< 0.0001	2.922	1.630 – 5.238
PCOS	1.781	0.522	0.001	5.933	2.131 – 16.520
PID	1.518	0.578	0.009	4.562	1.468 – 14.175
Diabetes mellitus in women	2.114	0.751	0.005	8.285	1.903 – 36.078
Constant	-35.901	4.555	< 0.0001	0.000	

Note: B- regression coefficient; OR –Odds ratio; S.E –Standard error; CI – Confidence interval.

when compared to a Mysore study (primary infertility 12.5%).[9] According to a systematic review, the global trends in infertility were similar in 1990 and 2010, with 0.1% decrease in primary infertility and 0.4% increase in secondary infertility.[6] Researchers, based on census of India, opine that childlessness in India has risen by 50 per cent since 1981.[10]

The age group of 35-39 years had more proportion of infertile men and womenand infertility was found more among couples who were married for 5 – 9 years (17.7%) in the current study. According to DLHS-3 Kerala, majority of infertile couples belonged to the age group of 30 -34 years (12.2%) followed by the age group of 35 – 39 years (11.2%) and the percentage of infertility was more among those married for 5-9 years (12.4%). [4] Aging has a significant impact on male sexual function, sperm parameters, and fertility.[11] Reproductive system of women has peak efficiency in the early 20's and steadily decline there after. The percentage of married women remaining childless increased with age and age at marriage.[12]

The percentage of infertility was more in couples who had education up to high school level and similar findings were observed by other studies.[7,8,10] Majority of the women and men among the infertile couples were unemployed and skilled workers respectively and this finding was consistent with a previous study.[10] Among the infertile couples, majority of them were Hindus followed by Christians and Muslims. Data from DLHS-3[4] and other studies[7,10] showed this trend. The current study showed association of infertility with joint family. It was reported that 65.2% of infertile couples lived in joint family.[8] Socioeconomic status and infertility were inversely related, with majority belonging to upper lower class (17.3%) followed by lower middle class (12.1%) and then upper middle class (6.6%). In Kerala, most of the infertile couples belonged to lowest wealth index category (18.5%)[4] correspondingly previous studies reported that the couples of higher classes had more children, better parameters in semen analysis and better ovarian reserve.[13] Menstrual disorders was found to have association with infertility and the result was consistent to the report by another study.[7]

Tubal infertility is a complication with PID with its incidence reported to be 8%, 19.5% and 40% after one, two and three episodes of PID respectively.[12]The current study also found statistically significant association with PID. Fibroids was found to be associated with infertility. Fibroids with a submucosal or an intracavitary component are associated with decreased reproductive outcomes.[14] Endometriosis causes anatomic distortion from adhesions or fibrosis and the known presence of inflammatory mediators exert toxic effects on gametes, embryos, tubal fimbria and ectopic endometrium.[12] Though 14.3% of women with endometriosis and 10.3% of women without endometriosis had infertility, the association was not statistically significant. One of the long-term complications of PCOS is anovulatory infertility.[15] The current study found statistically significant association with PCOS. The association of diabetes and infertility in women could be because diabetes reduces fertility in women due to menstrual abnormalities.[12]

Oligozoospermia refers to semen with low concentration of sperm, abnormalities in sperm morphology, motility, and is a common finding in male infertility and the current study finding was consistent with previous report.[16] Orchitis is the most common complication of mumps and bilateral mumps orchitis was reported to experience infertility.[17] In the current study, 28.6% of men with history of mumps had infertility and was statistically significant. Varicocele was found to have significant association with infertility and a previous study reported lower semen parameters among infertile men with varicocele.[18] Alcohol consumption leads to progressive deterioration of semen quality and quantity.[19] In the present study, 12.4% of alcoholic men had infertility and the association was statistically significant. Smoking was found to have association with infertility, as reported, heavy smoking may have a detrimental effect on the motility of sperm and is associated with decreased sperm count.[20] Around 50% of the women with previous history of pelvic/abdominal surgeries had infertility and the association was statistically significant as abdominal surgeries may lead to adhesions and infertility in some cases.[21] The role of genetic/inherited disease and specific abnormalities in the Y chromosome are found to cause male infertility.[22] Around 17.6% of men with family history of infertility had infertility and this association was found to be statistically significant. The study couldn't find such association in women and this result contradicts the finding by a previous study.[10]

Conclusion:

The prevalence of infertility was 10.3% with primary infertility of 5.6% and secondary infertility of 4.7%. Socio economic status (lower middle class), age at marriage in women (≥35 years), number of years after marriage (5 – 9 years), smoking in men, oligozoospermia, mumps in men, varicocoele, PCOS, PID and diabetes mellitus in women were found as independent predictors of infertility.

Acknowledgement:

Authors express gratitude to the study participants and the ASHA workers of Arpookara panchayat, Kottayam, Kerala, India.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References:

1. World Health Organization. Reproductive Health and Research. Reproductive health indicators: guidelines for their generation, interpretation and analysis for global monitoring. World Health Organization;2006. Available from https://www.who.int/publications/i/item/9789241563154. Last Accessed on 2/09/2023.
2. WHO. Infecundity, infertility, and childlessness in Developing countries – DHS Comparative Reports No.9; 2004. Available from https://www.who.int/publications/m/item/infecundity-infertility-and-childlessness-in-developing-countries---dhs-comparative-reports-no.-9. Last accessed on 2/09/2023
3. Looking back, looking forward: a profile of sexual and reproductive health in India. New Delhi: Population Council; 2004. Population Council. Infertility; pp. 67–72.
4. District Level Household and Faciity Survey (DLHS-3), 2007-08. International Institute for Population Sciences(IIPS), Kerala,

Mumbai, India, 2010.

5. Sharma R. Online interactive calculator for real-time update of the Kuppuswamy's socioeconomic status scale. Available from: www.scaleupdate.weebly.com (Accessed on 20/05/2016).
6. Mascarenhas MN, Flaxman SR, Boerma T, Vanderpoel S, Stevens GA. National, Regional, and Global Trends in Infertility Prevalence since 1990: A Systematic Analysis of 277 Health surveys. PLoS Med. 2012;9(12):e1001356.
7. Manna N, Pandit D,Bhattacharya R, Biswas S. A Community Based Study on Infertility and Associated Sociodemographic Factors in West Bengal, India. IOSR Journal of Dental and Medical Sciences. 2014;13(2):13–7.
8. Chethana R, Shilpa. Prevalence and Risk Factors influencing Primary Infertility. J Evol Med Dent Sci. 2014;3(13):3384–93.
9. Adamson PC, Krupp K, Freeman AH, Klausner JD, Reingold AL, Madhivanan P. Prevalence & correlates of primary infertility among young women in Mysore, India. Indian J Med Res. 2011 Oct;134(4):440–6.
10. Shamila S, Sasikala S. Primary Report on the Risk Factors Affecting Female Infertility in South Indian Districts of Tamil Nadu and Kerala. Indian J Community Med. 2011;36(1):59–61.
11. Harris ID, Fronczak C, Roth L, Meacham RB. Fertility and the Aging Male. Rev Urol. 2011;13(4):e184–e190.
12. Berek JS, Novak E. Berek& Novak's Gynecology. Fifteenth Edition. Wolters Kluwer India Pvt Ltd; 2012. 1000 – 1179.
13. Surekha T, Himabindu Y, Sriharibabu M. Impact of socio-economic status on ovarian reserve markers. J Hum Reprod Sci. 2013;6(3):201–4.
14. Pritts EA, Parker WH, Olive DL. Fibroids and infertility: an updated systematic review of the evidence. FertilSteril. 2009 Apr;91(4):1215–23.
15. Nidhi R, Padmalatha V, Nagarathna R, Amritanshu R. Prevalence of Polycystic Ovarian Syndrome in Indian Adolescents. J PediatrAdolesc Gynecol. 2011 Aug;24(4):223–7.
16. Chukwunyere CF, Awonuga DO, Ogo CN, Nwadike V, Chukwunyere KE. Patterns of seminal fluid analysis in male partners of infertile couples attending gynaecology clinic at Federal Medical Centre, Abeokuta. Niger J Med J. 2015 Jun;24(2):131–6.
17. Masarani M, Wazait H, Dineen M. Mumps orchitis. J R Soc Med. 2006;99(11): 573-575.
18. 18.Jensen C, Ostergren P, Dupree J, Ohl D, Sonksen J, Fode M. Varicocele and male infertility. Nat Rev Urol. 2017;14:523-533
19. Gaur DS, Talekar MS, Pathak VP. Alcohol intake and cigarette smoking: impact of two major lifestyle factors on male fertility. Indian J PatholMicrobiol. 2010 Mar;53(1):35–40.
20. Joo KJ, Kwon YW, Myung SC, Kim TH. The effects of smoking and alcohol intake on sperm quality: light and transmission electron microscopy findings. J Int Med Res. 2012;40(6):2327–35.
21. Ghobrial S, Ott J, Parry JP. An overview of Postoperative Intraabdominal Adhesions and Their Role on Female Infertility: A Narrative Review. J Clin Med. 2023;12(6):2263
22. Zorrilla M, Yatsenko AN. The Genetics of Infertility: Current Status of the Field. Curr Genet Med Rep. 2013;1(4):10.1007/s40142-013-0027-1.

A Community-based Epidemiological Study on non-fatal Road Traffic Accidents in Puducherry, South India

Lalithambigai Chellamuthu[1], Devi Kittu[2], Yogesh A Bahurupi[3], Kavita Vasudevan[4]

[1]Assistant Professor, Department of Community Medicine, Mahatma Gandhi Medical College and Research Institute, Sri Balaji Vidyapeeth, Puducherry
[2]Professor, [4]Professor & Head, Department of Community Medicine, Indira Gandhi Medical College and Research Institute, Puducherry,
[3]Associate Professor, Department of Community & Family Medicine, All India Institute of Medical Sciences, Rishikesh, Uttarakhand

Correspondence : : Dr. Lalithambigai Chellamuthu, Email: lalli.muthu@gmail.com

Abstract:

Introduction: Road traffic accidents are the sixth leading cause of death in India with a greater share of hospitalization, disabilities, deaths and socio-economic losses. **Objective:** To identify the pattern of non-fatal road traffic accidents, socio-demographic profile of accident victims and antecedent factors influencing these road traffic injuries. **Method:** A cross-sectional study was conducted for six months in Puducherry. From existing 27 wards of Lawspet, six wards were selected by simple random sampling technique and all the households in selected wards were included. The minimum required sample size was estimated to be 165 by considering prevalence of non-fatal road traffic accidents in Puducherry as 5.6%. Face-to-face interview with a semi-structured questionnaire was used for data collection. Data entry and analysis were performed using Epi-data manager 4.2.0. **Results:** Total 169 accident victims were included in the study from the households of selected wards. Mean age of the accident victims was found to be 36.2 (11.4) years. Two-wheeler accidents accounted for 144 (85.2%) and 123 (72.7%) accident victims were drivers at the time of accident. Majority (95.1 %) of the victims did not wear helmet while driving two-wheelers and none of the four-wheel drivers/pillions wore seat belts. Majority of the accidents occurred on usual tar roads 116 (68.6%) and 42 (24.9%) on highways. 102 (60.4%) accidents occurred in bi-directional roads. **Conclusion:** Simple or minor injuries were high compared to serious injuries requiring hospitalization. Majority of the accidents occurred during Fridays, Saturdays and Sundays. The accidents exhibited a bimodal distribution with day and night time.

Key Words : Epidemiology, Injury, Road Traffic Accident

Introduction:

Road traffic accidents (RTAs) are a major public health concern globally especially in low-and middle-income countries. One-fifth of fatalities due to road traffic accidents occurred in South Asia and road traffic injuries are projected to increase by 144% by 2020. [1]India with rapid urbanization coupled with surge in motorization has resulted in 8% increase of road traffic fatalities annually for the last ten years and show no signs of decreasing trend. [2]The National Crime Records Bureau (NCRB) has reported highest rate of accidental deaths per lakh population in Union territory of Puducherry. [3,4]The increase in number of road traffic injuries were attributed to rapid rise in vehicle density on roads, poor adherence to traffic

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Chellamuthu L,Kittu D, Bahurupi Y, Vasudevan K.A Community-based Epidemiological Study on non-fatal Road Traffic Accidents in Puducherry, South India. Healthline. 2023; 14 (3): 183-189
	DOI : 10.51957/Healthline_ 530_2023	

rules and regulations, poorly maintained and congested roads. [5]Human, vehicular and environmental factors play roles before, during and after a trauma event therefore accidents have to be studied in terms of an epidemiological model (agent, host and environmental factors) and analysed in relation to time, place and person distribution. [6]Most of the existing literature were all hospital-based and some being record-based studies. [6,7]With this background, the objective of this study was to identify the pattern of road traffic accidents, socio-demographic profile of accident victims and antecedent factors influencing these road traffic injuries in Puducherry, South India.

Method:

A community-based, cross-sectional study among road traffic accident victims was conducted from March to August 2019 (six months) in Lawspet, one of the most densely populated urban constituencies in Puducherry district, South India.[8] Lawspet was selected as the urban health training centre the medical college has been located in that area. In this study, the definition of an adult was considered as any individual who had completed 18 years of age.[9] Operational definition of road traffic accident was contemplated as "an accident which occurred or originated on a way or street open to public traffic; resulted in one or more persons being injured, and at least one moving vehicle was involved."[10] The definition of serious injuries were fractures, severe general shock requiring medical treatment and any other serious lesions entailing admission in hospital for more than 24 hours.[10] Whereas, the simple injuries were all injuries not mounting to serious injuries or where hospitalization in less than 24 hours. As per World Health Organization (WHO), simple injuries and serious injuries have a recall period of three and twelve months respectively.[10] Therefore, the inclusion criteria for study participants wasindividual residing in Lawspet (during the period of recruitment – six months) who had met with a road traffic accident within three months from the day of household visit. Death due to road traffic crashes, repeat accident to the same individual in the past three months, victim not giving consent were excluded from the study.

The minimum required sample size was estimated to be 165 by considering prevalence of non-fatal road traffic accidents in Puducherry as 5.6%[12] with absolute precision as 4% and a non-response rate of 20% in the formula $N=4pq/d$[2] [13] From existing 27 wards of Lawspet, six wards were selected by simple random sampling technique using lottery method and all the households in selected wards were included.

All the households in the selected six wards were visited at least twice during data collection period. Households that were found locked on first or second visit; an additional visit were made to those households within two weeks. Households that were found locked in all three visits were excluded. Approximately 20,000 populationswas screened for non-fatal road traffic injuries among the six wards. A pilot tested, face validated, semi-structured questionnaire consisting of questions related to socio-demographic profile, type and pattern of road traffic accident, hospitalization details was employed for data collection. Face-to-face interviews were conducted among adult victims whereas those victims who were $\leq$ 18 years data was collected from head of the family and/or mother of the victim. Adult victims were asked to give written informed consent. Written informed consent was obtained from guardian and parents if the accident victim was $\leq$ 18 years. Also, written informed assent was sought accident victims $\leq$ 18 years. Ethical clearance for this study was received from the Institute Ethical Committee (No. IEC/PP/2017/41). Data entry and analysis was performed using Epidata software. Descriptive data were represented as mean ± SD or median (IQR) for numerical variables. Percentages and proportions for categorical variables were used. Appropriate tests of significance, Chi-square test or Fisher's exact test was applied to find the association between the injury types and socio-demographic determinants. Values of $p < 0.05$ was considered to be statistically significant.

Results:

A total of six wards of Lawspet was covered in this study. Around 20,000 population was screened to find the non-fatal injuries within past three months from the time of data collection. A total of 169 accidents victims were identified in the house-to-house survey. The Table 1 depicts socio-demographic profile of road traffic accident victim and their head of the family respectively. Around 56 (33.1%) road traffic accident victims belonged to age group 34-43 years, 50 (29.5%) in 24-33 years; 23 (13.6%) in 44-53 years and in 14-23 years; 15 (8.8%) in ≥54 years. This study observed that the mean (SD) age of the accident victims to be 36.2 (11.4) years. The mean (SD) of number of family members was found to be 3.7 (1.1).

Table 1 : Socio-demographic profile of road traffic accident victims (N= 169)

Socio-demographic variables	**n(%)**
Gender	
Male	146 (86.4)
Female	23 (13.6)
Marital Status	
Married	125 (74.0)
Single/Widowed/Separated	44 (26.0)
Education	
No formal education	4 (2.4)
School level (1-12 class)	117 (69.2)
Graduate & above	48 (28.4)
Occupation	
Unemployed/Housewife	20 (11.8)
Unskilled	34 (20.1)
Semi-skilled	20 (11.8)
Skilled	39 (23.1)
Clerical/shop/farm	9 (5.3)
Semi-professional	18 (10.7)
Professional	29 (17.2)
Socio-economic status (Modified Kuppuswamy classification 2019)	
Upper middle class	62 (36.7)
Lower middle class	52 (30.8)
Upper lower class	55 (32.5)
Religion	
Hindu	156 (92.3)
Christian	10 (5.9)
Muslim	3 (1.8)
Type of family	
Nuclear family	148 (87.6)
Joint family	11 (6.5)
Other family types	10 (5.9)

Table 2 : Distribution of accident victims based on role of victim, mode of transport, type and direction of road (N= 169)

Variable	n(%)
Role of victim	
Driver	123 (72.7)
Occupant	30 (17.7)
Pedestrian	16 (9.5)
Mode of transport	
Two-wheeler	144 (85.2)
Three-wheeler	4 (2.4)
Four-wheeler	5 (3.0)
Pedestrian	16 (9.5)
Type of road	
Highway	42 (24.9)
Usual tar road	116 (68.6)
Mud road	11 (6.5)
Direction of road	
One-way	33 (19.5)
Bi-directional	102 (60.4)
Junction	34 (20.1)

Table 3 : Distribution of victims based on hospitalization, injury type and place of treatment (N= 169)

Variable	n(%)
Hospitalization	
Yes	43 (25.4)
No	126 (74.6)
Duration of hospitalization (n=43)	
<24hours	27 (62.7)
≥24 hours	16 (37.2)
Type of injury	
With fracture	38 (22.5)
Without fracture	131 (77.5)
Severity of injury	
Serious	16 (9.5)
Simple	153 (90.5)
First aid	
Received	18 (10.7)
Not received	151 (89.3)
Place of treatment	
Government	119 (70.4)
Private	50 (29.6)

Table 4 : Association between injury type and treatment

Variable	Injury type		X^2 value *(p-value)*
	Simple injuries	Serious injuries	
Occurrence of fracture			
Yes	22 (57.9%)	16 (42.1%)	60.566 (0.001) *
No	131 (100.0%)	0 (0.0%)	
Hospitalization			
Yes	27 (62.8%)	16 (37.2%)	51.480 (0.001) *
No	126 (100.0%)	0 (0.0%)	
First aid			
Yes	12 (66.7%)	6 (33.3%)	13.308 (0.003) *
No	141 (93.4%)	10 (6.6%)	
Place of treatment			
Government	118 (99.2%)	1 (0.8%)	34.927 (0.000) *
Private	35 (70%)	15 (30%)	
***Chi-square test, p-value< 0.05 considered significant.**			

The road traffic accident victims were classified into different socio-economic class based on modified Kuppuswamy classification (2019). [14]The median (IQR) income of theaccident victims was INR 13000 (8000-20000) whereas it was INR 14000 (10000-20500) for the victims' total family.

It was observed that 37 (21.9%) of the accidents happened to be on Fridays, followed by 33 (19.5%) on Mondays, 30 (17.8%) on Saturdays and 19 (11.2%) on Sundays. The accidents recorded during day time (6:00am to 6:00pm) were 97 (57.3%) while 72 (42.7%) of the road traffic accidents took place during the night time. The distribution of accident victims based on role of victim, mode of transport, type and direction of road has been depicted in Table 2.

In the current study, excluding the 16 pedestrians, among 153 accident victims, 86 (56.2%) were under the influence of alcohol at the time of accident. Mobile usage during driving was reported in 17 (11.1%) at the time of accident. Out of 144 accident victims who travelled in two-wheelers, only 7 (4.9%) had worn helmet at the time of accident. Excluding the 16 pedestrians, among 153 participants, 5 had travelled in four-wheeler and among those 5 victims none of them had worn seat-belts at the time of accident.

The Table 3 provides the distribution of victims based on hospitalization, injury type and place of treatment. Out of 169 study subjects, 147 (87.0%) had loss of working days as a result of the accident. The median (IQR) number of working days lost was 3 (2-5) days.

The Table 4 shows the association between the injury type and occurrence of fracture, hospitalization, receiving first aid and place of treatment. It was found to be statistically significant (p-value <0.05). While, there was no association found between the injury type and socio-demographic factors.

Discussion:

The present study noticed that the mean (SD) age of the study participants was 36.2 (11.4) years. Majority of the study victims belonged to young and middle-aged population. This might be attributed to the fact that productive age group people tend to travel more than other age group people for work and other necessities. These findings were consistent with earlier study. [5]

It was observed that the proportion of male accident victims were high in this study which was correlating with existing literature.[5,15] Male dominance as road traffic accident victims could be attributed to the fact that males normally work outside the home and are the primary economic support for the family. Families face economic crisis when the primary economic earner is injured and hospitalized, leaving the family in a position where they need to spend money on treatment although their earnings have ceased or reduced.

In the current study conducted among 169 accident victims, majority of the accidents occurred during Fridays, Saturdays and Sundays. This trend could be possibly explained as Fridays, Saturdays and Sundays are the days tourists tend to flood Puducherry which makes it crowded. People celebrate weekends and possibly are in ahurry to go to various places to join their working places on the following Monday. These findings were consistent with a previous study were Saturdays and Sundays noticed maximum accidents. [16]

The present study witnessed that 57.3%of the road traffic accidents occurred during the day time (6:00am to 6:00pm) and 42.7%of the road traffic accidents occurred during the night time (6:00pm to 6:00am), this bimodal distribution might be because school, college and work hours are reasonably staggered. The schools and colleges start around 8:00am and ends at 4:00pm; private offices open between 8am and 9am, government offices between 9:00amand 10:00am, and shops around 11:00am. Further, in the night time people would expect lower traffic volume levels and hence people drive faster at night. Most shops stay open until 9:00pm, and restaurants generally serve customers until 11:00pm. Similar result was reported from a study where the accidents were relatively constant between the hours of 10:00am and 6:00pm. The study also showed high number of accidents between 8:00pm and 11:00pm.[17]

Amongst 153 accident victims excluding 16 pedestrians, 56.2% were under the influence of alcohol at the time of accident. Mobile usage during driving was reported in 11.1% at the time of accident. Other studies from India have also established high proportion of drunken driving among the accident victims in their respective studies.[18-20] Yet, these proportions from other studies were low when compared to the present study.

Out of 144 two-wheeler travelers, only 4.9%had worn helmet at the time of accident. Excluding the 16 pedestrians, among 153 participants, five had travelled in four-wheeler and among those five accident victims none of them had worn seat-belts at the time of accident. These findings were in contrast with other Indian studies where in the proportions of helmet and seat-belts usage was found to be better.[19]

Among 169 participants, 25.4% were hospitalized as a result of the road traffic accident. Out of which 16 out of 24 victims (37.2%) were hospitalized for 24 hours or more who were considered to be serious injury victims as per the operational definition framed for this study. The mean (SD) duration of hospitalization was 7 (3.1) days and the median (IQR) duration of treatment was 8 (7-13.5) days. This current study found shorter hospital stays compared with other studies, which can be attributed to the fact that this study had only 16 serious injuries (9.5%) amongst 169 study subjects. Other Indian studies have shown higher rates of hospital admissions and longer duration of hospital stays. [21,22]

The strength of the study is that it is one among the few community-based studies done on road traffic accident victims which gives the true estimates of the non-fatal road traffic accidents.

Limitation of the study: Only 169 accident victims and also households from only six selected wards were included in the study. Hence, the results obtained from this study can't be generalized.As the detailed regarding vehicle involved in the accident were not clearly sought from the participants the same was not incorporated in the study.

Conclusion:

In this study, majority of the study victims belonged to young and middle-aged population with

male preponderance. Majority of the accidents occurred during Fridays, Saturdays and Sundays. The accidents exhibited a bimodal distribution with day and night time. Accident was common with two-wheelers as compared to other vehicles. Few victims were hospitalized as a result of the road traffic accident and a very few had serious injuries in this study.

Declaration :

Funding: Nil

Conflict of Interest: Nil

References:

1. Alam K, Mahal A. The Economic Burden of Road Traffic Injuries on Households in South Asia. Nugent RA, editor. PloS one. 2016 Oct 21;11(10):e0164362.
2. Ruikar M. National statistics of road traffic accidents in India. J OrthopTraumatolRehabil. 2013;6(1):1.
3. National Crime Records Bureau. Accidental deaths and suicide report in India [Internet]. Government of India; 2019 [cited 2021 Jan 27]. Available from: https://ncrb.gov.in/sites/default/files/Chapter-1-Accidents_2019.pdf
4. Department of Transport. Road Safety Policy and Action Plans for the Union Territory of Puducherry [Internet]. Government of Puducherry; 2015 [cited 2021 Jan 27]. Available from: https://transport.py.gov.in/sites/default/files/actionplan.pdf
5. Naveen NT, Arun M, BalakrishnaRao AJ, Kagne RN. Profile of Road Traffic Accident cases in a Tertiary care Hospital, Puducherry. Int J Recent Trends Sci Technol. 2015;14(1):63–7.
6. Singh A, Bhardwaj A, Pathak R, Ahluwalia SK. An Epidemiological Study of Road Traffic Accident Cases at a Tertiary Care Hospital in Rural Haryana. Indian J Community Health.2011;23(2):53–5.
7. Sharma D, Singh US, Mukherjee S. A study on road traffic accidents in Anand-Gujarat. Health line.2011;2(2):12-5.
8. Directorate of census operations, Puducherry UT. District census handbook of Puducherry [Internet]. Ministry of home affairs; 2011. Available from: https://censusindia.gov.in/2011census/dchb/3402_PART_B_DCHB_PUDUCHERRY.pdf
9. Government of India. The Indian Majority Act, 1875 [Internet]. [cited 2021 Jan 11]. Available from: https://indiankanoon.org/doc/80664820/
10. OECD health statistics 2017 definition, sources and methods on injuries in road traffic accidents [Internet]. [cited 2021 Nov 1]. Available from: https://www.coursehero.com/file/24146792/HEALTH-STAT-12-Injuries-in-road-traffic-accidentspdf/
11. McGee K, Sethi D, Peden M, Habibula S. Guidelines for conducting community surveys on injuries and violence. Inj Control Saf Promot.2004;11(4):303–6.
12. Kalaiselvana G, Dongre AR, Mahalakshmy T. Epidemiology of injury in rural Pondicherry, India. J Inj Violence Res.2011 ;3(2):62–7.
13. BhalwarRajvir. Textbook of Public Health and Community Medicine. AFMC, Pune in collaboration with WHO, India office, New Delhi; 2009. 252 p.
14. Saleem SM. Modified Kuppuswamy socioeconomic scale updated for the year 2020. Indian J Forensic Community Med.2020;7(1):1–3.
15. Biswas S, Naiya S, Ghosal A, Basu G, Dasgupta R, Roy S. An Epidemiological Study on Road Traffic Accident in Urban West - Bengal. J Evol Med Dent Sci.2015;4:10533–8.
16. Kakkar R, Aggarwal P, Kakkar M, Deshpande K, Gupta D. Road traffic accident: retrospective study. Indian J. Sci. Res.2014;5(1):59.
17. Mohan D, Tiwari G, Mukherjee S. Urban traffic safety assessment: a case study of six Indian cities. IATSS Res.2016;39(2):95-101.
18. Mohan D. Traffic Injuries and Fatalities in India. Indian Institute of Technology Delhi.: Transportation Research & Injury Prevention Programme; 2004. 13 p.
19. Sreedharan J, Muttappillymyalil J, Divakaran B, C Haran J. Determinants of safety helmet use among motorcyclists in Kerala, India. J Inj Violence Res.2010;2(1):49–54.
20. Mahajan N, Aggarwal M, Raina S, Verma LR, Mazta SR, Gupta BP. Pattern of non-fatal injuries in road traffic crashes in a hilly area: A study from Shimla, North India. Int J CritIllnInj Sci.2013;3(3):190–4.
21. Kar S, Das SC, Tiwari A, Pharveen I. Pattern of road traffic accidents in Bhubaneswar, Odisha. Clin. Epidemiology Glob. Health.2016;4(3):115-9.
22. Roy N, Murlidhar V, Chowdhury R, Patil SB, Supe PA, Vaishnav PD, Vatkar A. Where there are no emergency medical services—prehospital care for the injured in Mumbai, India. Prehosp Disaster Med.2010;25(2):145-51.

The status and socio-demographic predictors of geriatric malnutrition of rural Maharashtra of central India: A cross-sectional study

Ruchita Ramesh Khandre[1], Abhishek Raut[2], Ashwini Kalantri[2], Sophiya K[3]

[1]Senior Resident, Department of Community Medicine, Bharatratna Atalbihari Vajpayee Medical College (BAVMC), Pune, Maharashtra

[2]Professor, [3]Senior Resident, Department of Community Medicine,Mahatma Gandhi Institute of Medical Sciences, Sevagram, Wardha, Maharashtra

Correspondence : Dr. Sophiya K, Eamil: inukalai@gmail.com

Abstract:

Introduction: The elderly population has a lot to give to society but various issues like malnutrition hinder their activities and affect their quality of life. **Objectives:** The current study was proposed to assess the nutritional status of the elderly in rural Maharashtra of central India. **Method:** This cross-sectional study recruited 460 elderly individuals and was conducted in selected four villages of same district in central India for 5 months (Aug-Dec 2021). Stratified sampling method was used. This study used the MNA (Mini Nutritional Assessment) questionnaire and haemoglobin level to assess the nutritional status of the elderly. Univariate analysis and multivariate analysis were carried out using R software. **Results:** Out of 460 study subjects, 42 (9.13%) were malnourished and 286 (62.17%) were at risk of malnutrition.The study assessed 300 elderly for hemoglobin status and 129 (43%) were found anemic.The elderly who belonged to the age group 71-80 years had lesser odds of having satisfactory nutritional status (OR=0.53) while age group >80 years was more prone to anemia (OR= 1.71). The odds of satisfactory nutritional status were higher for elderly who had education less than secondary school (OR=2.02) and for elderly those who had completed high secondary schooling (OR=4.94) and those who belonged to the nuclear family (OR=1.59). The study showed elderly who belonged to Open caste had lesser odds of having anemia (OR=0.68). **Conclusion:** The study found high prevalence of anaemia (43%) and at-risk malnutrition (62.17%) in the geriatric population. Policymakers should prioritise nutritional interventional policy, and stakeholders should promote the existing nutritional policies of this vulnerable group

Key words : Anemia, Elderly, Malnutrition, Mini-Nutritional Assessment

Introduction:

The elderly are a vulnerable population; neglected in many cultures because of their mental and physical weakness. Several elderly people are ignored, marginalised, and rendered useless.[1] A variety of factors influence their health and vulnerability, including nutritional consumption, chronic illness, social support, and so on.[2] There are two broad aspects in geriatric health: psychosocial condition and malnutrition.

Malnutrition includes undernutrition, micronutrient deficiency, and over-nutrition. The Gerontology Society of America stated that malnutrition can be defined as having recently lost weight without trying or eating poorly because of decreased appetite.[3] A vicious cycle exists between

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Khandre R, Raut A, Kalantri A, Sophiya K.The status and socio-demographic predictors of geriatric malnutrition of ruralMaharashtra of central India: A cross-sectional study. Healthline. 2023; 14 (3): 190-200
	DOI : 10.51957/Healthline_ 536_2023	

malnutrition and chronic disease. Malnutrition can exacerbate an existing illness, and chronic illness can impair appetite, resulting in malnutrition.[4] Malnutrition has an impact on the quality of life of elderly individuals by limiting physical activity and causing mental stress, both of which lead to socio-emotional discomfort.[5] The elderly population is diverse in their physical, social, and economic activities. They have a lot to give to the society but the various issues like malnutrition hinder their activities and affect their quality of life. With the predictable patterns of population ageing, we will witness a demographic shift, necessitating the need to prepare the society to address their issues like malnutrition of the elderly. To better comprehend the ageing population and create options for their improvement, more research is required. Many research on the ageing population have been conducted in nations such as the United Kingdom, China, Taiwan, and Europe. But, there are various sub-areas in geriatrics in India that require additional research.[6]

Not many studies related to the nutritional status of the elderly have been conducted in central India. This study will throw light on the nutritional status and their predictors among the elderly in rural areas.

Objective:

The present study was carried out to assess the nutritional status of the elderly in rural areas using the Mini-Nutritional assessment tool (MNA tool) and Haemoglobin estimation, and to study the socio-demographic predictors of malnutrition among the elderly.

Method:

A cross sectional study was conducted for five months (Aug-Dec 2021) in selected four villages in central India, which were the field practice areas of a Medical College. These adjacent villages were chosen on a convenient basis, considering the feasibility to facilitate the timely delivery of blood samples from the field to the pathology lab at the Medical College.

Study population-

This study recruited elderly males and females (>60 years of age) to evaluate nutritional status, as well as determinants, because both are vulnerable.

Inclusion criteria

- Apparently healthy individual
- An individual who gives consent

Exclusion criteria

- The elderly with comorbid conditions like diabetes, hypertension, and chronic obstructive pulmonary diseases (COPD) with a duration of more than 1 year
- Uncontrolled or with complications of comorbid conditions
- Bed-bound elderly
- Had diminished hearing and visual sensations

This study was carried out on 460 elderly individuals. This sample size was calculated by using Open Epi[7] using the prevalence of malnutrition in the elderly (78.6%) from a previous study. [8]and with 5% absolute precision. The sampling method used was stratified random sampling. So, 1.5 design effect for stratified sampling method was included with 10% non-response rate. Among the study population after applying the finite population correction, for estimating 38% hypothesized prevalence of anemia[9] with 5% absolute precision, at a 95% confidence level, a sample size of 300 elderly was needed for hemoglobin estimation. The study participants for haemoglobin estimation were selected randomly out of total sample. Accordingly, blood sampling was done in a subgroup of 300 elderly.

Stratified random sampling was used. The list of elderly from selected villages was procured from the departmental database. An elderly individual was the unit of study. The obtained list was stratified according to age. Then elderly individuals were chosen randomly from each stratum as per their proportional population size of each stratum considering the village and gender.

Method of measurement

a. **Socio-demographic data**- A pretested semi-structured interview schedule was used to collect information of socio-demographic profile. It included details on age, gender, caste, religion, education, working status, socio-economic status, contact number, family type.

b. **Tool for measurement of nutritional status**- This study used the MNA (Mini Nutritional Assessment) questionnaire [10] and haemoglobin level to assess nutritional status in the elderly. MNA tool is useful to assess nutritional status in the elderly. MNA questionnaire is 18 items validated nutritional screening tool. A maximum of 30 points can be obtained. A score <17 indicates malnutrition, a score of 17 – 23.5 indicates the risk of malnutrition while >24 score indicates satisfactory nutritional status.MNA tool is validated and used in India for assessing nutritional status in the elderly. [10]

While, Hb value <12mg/dl for women [>15 years of age] and <13mg/dl for men [>15 years of age] was considered as cut-off value for anemia.[11] According to the WHO, anemia is graded as- mild (Hb men:11-12.9 gm%, Hb women: 11-11.9gm%), moderate (Hb in both: 8-10.9 gm%), severe (Hb in both: <8 gm%) and same criteria had been used to classify anemia in the present study. [12]

Methods of data collection

In the first phase, questionnaires were made in the KOBO toolbox which were then imported in the android hand-held device through KOBO collect app (which is useful for paperless data collection) and pre-tested. Pretesting was carried out to find out any scope for improvement.

The second phase- Data collection was started after taking informed written consent from selected individuals. Interviews were conducted through house to house visits. MNA questionnaire included anthropometric measurements like BMI, Calf circumference, Mid-upper arm circumference. BMI was measured using the formula: weight in kg divided by the square of height in meters. In the end, a blood sample was collected for the haemoglobin estimation. Haemoglobin estimation was done by an automated method.

Data from the KOBO tool was exported as an excel sheet. Analysis was carried out using R software. Univariate analysis was carried out to find frequency and proportions. Multivariate analysis was done by the ordinal and binomial logistic regression methods to find the predictors of nutritional status and anemia respectively. As nutritional status was an ordinal outcome variable, ordinal logistic regression was done. The proportional odds model was used and it was assumed that the effect of exposure is the same for all splits of the categories of the outcome variable.[13] In the model, malnutrition, at risk of malnutrition, and satisfactory nutritional status were the different outcome categories.

Ethical Consideration:

The current study was a part of the thesis which was initiated only after the approval from the Institutional Ethics Committee. The informed consent was taken from the study participants before the application of the questionnaires. The elderly found with mild anaemia were treated with Iron-Folic acid tablets and nutritional counselling, while the elderly with moderate to severe anemia were referred to the nearest health center.

Table 1: Socio-demographic details of the study subjects (N = 460)

Characteristics		Frequency	Percentage
Age(years)	60 – 70	344	74.78
	71 – 80	100	21.74
	>80	16	3.48
Gender	Male	182	39.57
	Female	278	60.43
Religion	Hindu	345	75
	Muslim	18	3.91
	Christian	1	0.21
	Buddhism	96	20.87
Caste	Open	61	13.26
	Other Backward Class	205	44.57
	Scheduled Caste	119	25.87
	Scheduled Tribe	30	6.52
	Others	45	9.78
Education	No Formal school	151	32.83
	Primary Schooling	137	29.78
	Secondary Schooling	124	26.96
	Higher secondary schooling	28	6.08
	Graduation/Masters	20	4.35
Occupation	Farmer	67	14.57
	Business	22	4.78
	Retired	74	16.09
	Laborer	69	15
	Homemaker	129	28.04
	Unemployed	99	21.52
Type of Family	Nuclear	203	44.13
	Generation	247	53.70
	Joint	10	2.17
Caste	Open	61	13.26
	Other Backward Class	205	44.57
	Scheduled Caste	119	25.87
	Scheduled Tribe	30	6.52
	Nomadic tribes	45	9.78
Socio-economic status	APL(Above Poverty Line)	217	47.17
	BPL(Below Poverty Line)	153	33.26
	AYY(Antyodayi-extreme poverty)	90	19.57

Table 2: Responses from Participants on MNA Questionnaire (N=460)

MNA Questionnaire	Response options	n(%)
1. Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?	1. Severe decrease	19(4.13%)
	2. Moderate decrease	121(26.30%)
	3. No decrease	320(69.57%)
2. Weight loss during the last 3 months	1. Does not know	215(46.74%)
	2. No weight loss	155(33.70%)
	3. Weight loss between 1-3 kg	58(12.60%)
	4. Weight loss greater than 3 kg	32(6.96%)
3. Mobility	1. Bed or chair bound	0
	2. Able to get out of bed/ chair but does not go out	10(2.17%)
	3. Goes out	450(97.83%)
4. Has suffered psychological stress or acute disease in the past 3 months?	1. Yes	107(23.26%)
	2. No	353(76.74%)
5. Neuropsychological problems	1. Severe dementia or depression	10(2.17%)
	2. Mild dementia	78(16.96%)
	3. No psychological problems	372(80.87%)
6. Body Mass Index (BMI) = weight in kg / (height in m^2)	1. BMI less than 19	100(21.74%)
	2. BMI 19 to less than 21	88(19.13%)
	3. BMI 21 to less than 23	139(30.22%)
	4. BMI 23 or greater	133(28.91%)
7. Lives independently (not in a nursing home or hospital)	1. Yes	460(100%)
	2. No	0
8. Takes more than 3 prescription drugs per day	1. Yes	30(6.53%)
	2. No	430(93.47%)
9. Pressure sores or skin ulcers	1. Yes	16(3.48%)
	2. No	444(96.52%)
10. How many full meals does the patient eat daily?	1. 1 meal	33(7.17%)
	2. 2 meals	376(81.74%)
	3. 3 meals	51(11.19%)
11. Selected consumption markers for protein · intake At least one serving of dairy products (milk, cheese, yogurt) per day	1. Yes	104(22.61%)
	2. No	356(77.39%)
· Two or more servings of legumes or eggs per week	1. Yes	185(40.22%)
	2. No	275(59.78%)
· Meat, fish, or poultry every day	1. Yes	456(99.13%)
	2. No	4(0.87%)

12. Consumes two or more servings of fruit or vegetables per day?	1. Yes	423(91.96%)
	2. No	37(8.04%)
13. How much fluid (water, juice, coffee, tea, milk...) is consumed per day?	1. Less than 3 cups	15(3.25%)
	2. 3 to 5 cups	214(46.53%)
	3. More than 5 cups	231(50.22%)
14. Mode of feeding	1. Unable to eat without assistance	0
	2. Self-fed with some difficulty	42(9.13%)
	3. Self-fed without any problem	418(90.87%)
15. Self-view of nutritional status	1. Views self as being malnourished	373(81.09%)
	2. Is uncertain of nutritional state	47(10.22%)
	3. Views self as having no nutritional problem	40(8.69%)
16. In comparison with other people of the same age, how does the patient consider his / her health status	1. Not as good	98(21.30%)
	2. Does not know	67(14.57%)
	3. As good	266(57.83%)
	4. Better	29(6.30%)
17. Mid-arm circumference (MAC) in cm	1. MAC less than 21	48(10.43%)
	2. MAC 21 to 22	166(36.09%)
	3. MAC greater than 22	246(53.48%)
18. Calf circumference (CC) in cm	1. CC less than 31	331(71.96%)
	2. CC 31 or greater	129(28.04%)

Results:

Socio-demographic details of all study subjects are given in Table 1. All families of the elderly were having ration card. The nutritional status was assessed by using the MNA (Mini-Nutritional Assessment) questionnaire which is an 18 items instruments, in which the maximum score that could be obtained was 30. Out of 460 study subjects, 42 (9.13%) were malnourished, 286 (62.17%) were at risk of malnutrition, 132 (28.70%) were with satisfactory nutritional status. Out of 42 (9.13%), malnourished elderly, 11 (26.19%) were male, and 31 (73.81%) were female. While 112 (39.16%) males and 174(60.84%) females were at risk of malnutrition. Out of 132 (28.70%) elderly with satisfactory nutritional status, 59 (44.70%) were male and 73 (55.30%) were female.

MNA questionnaire items

During the nutritional assessment,26.30% and 4.13% of the elderly had a moderate and severe decrease in food intake, respectively, over the past 3 months due to loss of appetite, chewing, digestive, or swallowing problems. The study found that 46.74% of the study population did not have any idea about their weight loss, while 6.96% and 12.60% of the study population had weight loss >3 kg and weight loss between 1-3 kg, respectively. The study did not include any chronically ill or bed-bound subjects but around 2.17% of study subjects had mobility problems while 97.83% of study subjects could go out without any problem.

The study showed that 23.26% of the population had psychological stress/acute psychological condition in the past three months. BMI was calculated during application of the MNA

Table 3: Association of nutritional status with various sociodemographic factors (Multivariate analysis -Ordinal Logistic Regression)

Variables		ß coefficient	SE	aOR (Lower Limit-Upper Limit)	*p-value*
Age(years)	60 – 70	Ref			
	71 – 80	**-0.62**	**0.26**	**0.53(0.31-0.90)**	***0.01****
Gender	>80	-0.21	0.54	0.80(0.26-2.31)	*0.68*
	Male	-0.09	0.26	0.91(0.54-1.52)	*0.71*
	Female	Ref			
Caste	Open	0.47	0.5	1.60(0.61-4.44)	*0.34*
	Other Backward Class	0.05	0.44	1.06(0.64-2.62)	*0.9*
	Scheduled Caste	0.3	0.45	1.35(0.57-3.43)	*0.5*
	Scheduled Tribe	Ref			
	Nomadic tribes	0.63	0.51	1.88(0.70-5.29)	*0.21*
Education	No Formal school	Ref			
	Less than primary schooling	0.27	0.3	1.31(0.71-2.39)	*0.37*
	Primary school completed	0.46	0.35	1.60(0.80-3.18)	*0.18*
	Less than Secondary schooling	**0.7**	**0.34**	**2.02(1.03-3.98)**	***0.04****
	Secondary school completed	0.19	0.34	1.22(0.61-2.40)	*0.57*
	Less than Higher Secondary	0.97	0.87	2.65(0.44-15.85)	*0.26*
	Higher secondary school completed	**1.59**	**0.53**	**4.94(1.78-14.6)**	***0.002****
	Graduation and above	0.99	0.56	2.71(0.89-8.33)	*0.07*
Occupation	Farmer	0.21	0.35	1.24(0.62-2.47)	*0.53*
	Business	-1.16	0.6	0.31(0.09-1.01)	*0.054*
	Retired	-0.14	0.37	0.86(0.41-1.79)	*0.69*
	Laborer	-0.68	0.36	0.50(0.24-1.03)	*0.06*
	Homemaker	-0.18	0.31	0.83(0.45-1.53)	*0.54*
	Unemployed	Ref			
Type of Family	Nuclear	**0.46**	**0.2**	**1.59(1.06-2.39)**	***0.02****
	Generation	Ref			
	Joint	0.08	0.76	1.09(0.21-4.60)	*0.91*
Socio-economic status	APL	0.1	0.28	1.11(0.64-1.94)	*0.7*
	BPL	-0.24	0.29	0.78(0.44-1.39)	*0.39*
	AYY	Ref			

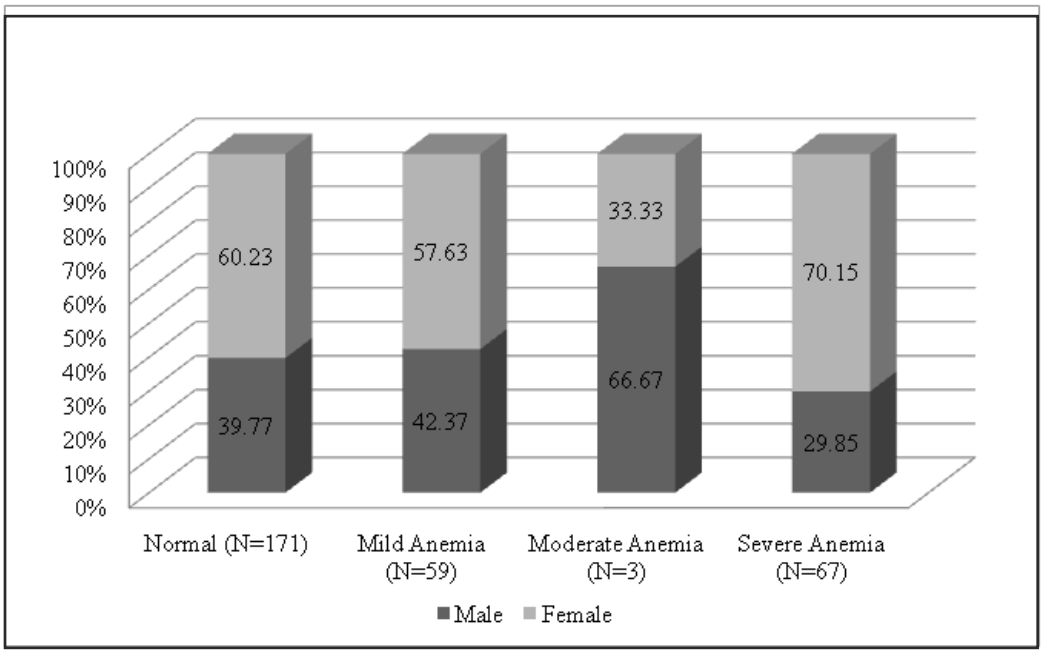
*=significant, pseudo R square=0.125

Table 4: Association of Anemia status with various factors (Multivariate Analysis- Binomial Logistic Regression)

Variables		Anemia N(%) n=117	No Anemia N(%) n=183	ß-coefficient	SE	aOR (Lower Limit-Upper Limit)	*p-Value*
Age (years)	60 - 70	89(37.55%)	148(62.45%)	Ref			
	71 - 80	20(37.04%)	34(62.96%)	-0.02	0.08	0.97(0.83-1.15)	*0.75*
	>80	**8(88.89%)**	**1(11.11%)**	**0.53**	**0.17**	**1.71(1.22-2.41)**	***0.002****
Gender	Male	43(37.39%)	72(62.61%)	0.03	0.07	1.04(0.90-1.20)	*0.59*
	Female	74(40%)	111(60%)	Ref			
Caste	Open	**5(16.13%)**	**26(83.87%)**	**0.38**	**0.14**	**0.68(0.51-0.90)**	***0.008****
	Other Backward Class	56(39.16%)	87(60.84%)	-0.12	0.11	0.88(0.70-1.11)	*0.28*
	Scheduled Caste	35(40.70%)	51(59.30%)	-0.12	0.12	0.88(0.69-1.12)	*0.3*
	Scheduled Tribe	12(60%)	8(40%)	Ref			
	Nomadic tribes	9(45%)	11(55%)	-0.1	0.15	0.90(0.66-1.22)	*0.51*
Education	No Formal school	45(43.69%)	58(56.31%)	Ref			
	Less than primary schooling	10(33.33%)	20(66.67%)	0.04	0.09	1.05(0.86-1.28)	*0.63*
	Primary school completed	17(47.22%)	19(52.78%)	-0.08	0.1	0.92(0.75-1.14)	*0.44*
	Less than Secondary schooling	17(38.64%)	27(61.36%)	-0.01	0.09	0.98(0.81-1.19)	*0.85*
	Secondary school completed	19(35.85%)	34(64.15%)	-0.001	0.09	1.00(0.83-1.20)	*0.98*
	Less than Higher Secondary	1(20%)	4(80%)	-0.11	0.23	0.89(0.56-1.40)	*0.6*
	Higher secondary school completed	4(25%)	12(75%)	-0.09	0.15	0.91(0.68-1.22)	*0.54*
	Graduation and above	4(30.77%)	9(69.23%)	-0.11	0.16	0.89(0.64-1.23)	*0.48*
Occupation	Farmer	8(23.53%)	26(76.47%)	-0.1	0.11	0.90(0.72-1.12)	*0.33*
	Business	1(11.11%)	8(88.89%)	-0.23	0.18	0.79(0.55-1.13)	*0.19*
	Retired	20(40%)	30(60%)	0.07	0.1	1.08(0.87-1.33)	*0.5*
	Laborer	22(45.83%)	26(54.17%)	0.07	0.1	1.08(0.89-1.31)	*0.45*
	Homemaker	41(43.62%)	53(56.38%)	0.09	0.09	1.10(0.92-1.31)	*0.32*
	Unemployed	25(38.46%)	40(61.54%)	Ref			
Type of Family	Nuclear	51(39.53%)	78(60.47%)	0.03	0.06	1.03(0.92-1.17)	*0.57*
	Generation	64(38.55%)	102(61.45%)	Ref			
	Joint	2(40%)	3(60%)	0.02	0.23	1.02(0.65-1.61)	*0.92*
Socio-economic status	APL	55(39.86%)	83(60.14%)	0.03	0.08	1.03(0.88-1.21)	*0.7*
	BPL	37(38.14%)	60(61.86%)	0.01	0.08	1.01(0.86-1.19)	*0.87*
	AYY	25(38.46%)	40(61.54%)	Ref			
Malnutrition	Malnourishment	15(48.39%)	16(51.61%)	Ref			
	At risk of Malnutrition	72(39.13%)	112(60.87%)	-0.1	0.11	0.90(0.72-1.11)	*0.32*
	No Malnourishment	30(35.29%)	55(64.71%)	-0.1	0.12	0.90(0.70-1.16)	*0.42*

*=significant, pseudo R square=0.164

Figure1 : Gender wise distribution of Anemia cases



tool, 21.74% of elderly had BMI less than 19kg/m^2, 19.13% had BMI between 19-21 kg/m^2, 30.22% had BMI between 21-23 kg/m^2, 28.91% had BMI greater than 23 kg/ m^2.

All the elderly in the study were living independently (not in a hospital). The study showed,6.53% were taking medication more than thrice a day. Most of the elderly 81.74% in the study ate 2 meals daily. While assessing protein intake the study found, only 22.61% of the elderly consumes at least one serving of dairy products daily, only 40.22% consumes two or more serving of legumes or eggs weekly. Majority of the elderly, 91.96% reported consuming two or more servings of fruits and vegetables daily and 50.22% drank more than five cups of fluid daily. The findings showed, 90.87% of the elderly were self-fed without any problem while 9.13% had some difficulty. In the study, 81.09% of the elderly viewed themselves as malnourished, 10.22% were uncertain while 8.69% viewed themselves without any nutritional problem. When we asked about their health status in comparison with other people of the same age, 21.30% of the elderly felt not as good, 14.57% were uncertain, 57.83% felt good, and only 6.30% felt better.

During the study, Mid-arm circumference (MAC) and calf circumference (CC) were measured. Around 53.48% of the elderly had MAC greater than 22cm. (Table 2).

The burden of anemia among elderly

In the study, 300 elderly were assessed for hemoglobin status and anemia was graded according to the WHO criteria. The study found that 171 (57%) of the elderly have normal hemoglobin while 129 (43%) were found anemic. The anemic participants further classified as, mild anemic (19.67%), moderately anemic (1%) and severly anemic (22.33%). Out of 59 (19.67%) mild anaemic elderly, 25 (42.37%) were males and 34 (57.63%) were females. Out of 67 (22.33%) severe anaemic elderly, 20 (29.85%) were males and 47 (70.15%) were females. (Figure 1)

Predictors of Nutritional Status

Different socio-demographic factors were studied and it was found that age, education, and type of family were significantly associated with malnutrition. The result (Table 3) showed age group 71-80 was more prone to malnutrition. The elderly who belonged to the 71-80 years of age group had

lesser odds of having satisfactory nutritional status (OR=0.53, 95% CI:0.31-0.90, *p=0.01*).

The elderly who had education less than secondary school (*p=0.04*) and who had completed high secondary schooling (*p=0.002*) had higher odds of having satisfactory nutritional status. While those who belonged to the nuclear family had higher odds of having satisfactory nutritional status (*p=0.02*).

Predictors of Anemia

The study (Table 4) showed age and caste were the factors significantly associated with anaemia. The elderly who belonged to >80 years of age had higher odds of having anemia(OR= 1.71, 95%CI: 1.22-2.41, *p=0.002*). While the elderly who belonged to Open caste had lesser odds of having anemia (OR=0.68, 95%CI: 0.51-0.90, *p=0.008*).

Discussion:

Malnutrition is a major health concern among the elderly, leading to a deterioration in physical and cognitive performance. While using the MNA tool, one specific item revealed that 81.09 % of the elderly considered themselves to be malnourished, the final score of the MNA tool revealed that only 9.13 % of the elderly were malnourished, and the majority (62.17 %) were at risk of malnutrition. Malnutrition was shown to be significantly associated with age, education, and family type in the study. Malnutrition is a multifaceted concept that arises from physical, psychological, biological, and social changes that occur in a variety of different settings. Only a few research had focused on the relationship between ageing and malnutrition.[14,15] But the current study showed a significant association between advanced age and malnutrition. Also, education as the important predictor of malnutrition has been demonstrated by several studies from low-middle income countries. [16–18]In the study, the nuclear family was identified to be a major protective factor for malnutrition. This may have been possible as a result of decreased food sharing (food availability), food purchasing freedom, and dietary preferences. In the study, 81.74 % of the elderly stated they ate two meals per day, and nearly 91.96% said they ate two or more portions of fruits or vegetables per day. The factors associated with food diversity and satisfactory nutrition status were found to be food availability, food shopping, and food preferences in different studies.[15,19,20]

In addition to the MNA questionnaire, haemoglobin estimation was done to assess malnutrition among the elderly and it showed that the anemia was more prevalent in females than males insignificantly. The present study showed advanced age (>80 years) and open category were the strongest predictors of anemia among the elderly (Table 4). Patel et.al, in their article, reported that after 50 years of age, the prevalence of anemia increases with advancing age and exceeds 20% in those aged 85 years and older.[11] The association of higher caste with anemia in the elderly was also found to be similar to a cross-sectional study that was conducted in South India. [21]

Based on the finding following recommendations may help the elderly to improve their nutrition status: a. Strengthening of promotive, preventive, and rehabilitative services within the primary health care service package can be a crucial step to add quality services to the elderly. b. Comprehensive geriatric assessment for the nutritional screening. c. Provision of social platforms for nutritional education, health camps.

The current study used a validated tool, which added strength to the study. Another strength of the study was that it evaluated nutritional status using both the MNA tool and haemoglobin estimate. The IFA (Iron Folic Acid) tablets were provided to the elderly who were found to be anaemic.

The study had several limitations. First, the limitation of over reporting. Second, recall bias could be a possibility. Third, the study excluded elderly who were confined to their beds and with comorbidities. However, it paves the way to future opportunities to understand their nutritional challenges.

Conclusion:

The current study concluded the prevalence of malnutrition was 9.13% among the elderly, and it was significantly associated with age, education, and the nuclear family. The prevalence of anaemia was 43% among the elderly, and it was significantly associated with age and caste. The geriatric age group had a significant prevalence of anaemia and was at risk of malnutrition, so policymakers should emphasise the intervention in the health programme. Strengthening a component of preventative, promotional, and rehabilitative care for the elderly may be desired.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References:

1. Anne S. Health and well being for older people. UK: Elsevier; 2002.
2. Dean M, Raats MM, Grunert KG, Lumbers M. Food in Later Life Team. Factors influencing eating a varied diet in old age. Public Health Nutr. 2009;12:2421–7.
3. Ahmed T, Haboubi N. Assessment and management of nutrition in older people and its importance to health. Clin Interv Aging. 2010; 5:207-16.
4. Saunders J, Smith T. Malnutrition: causes and consequences. Clin Med (Northfield Il). Royal College of Physicians; 2010;10:624.
5. Jiménez-Redondo S, Beltrán de Miguel B, Gavidia Banegas J, Guzmán Mercedes L, Gómez-Pavón J, Cuadrado Vives C. Influence of nutritional status on health-related quality of life of non-institutionalized older people. J Nutr Health Aging. 2014;18:359–64.
6. Tripathy J. Geriatric care in India: A long way to go. J Midlife Health. Medknow; 2014;5:203.
7. Dean AG, Sullivan KM SM. OpenEpi Menu [Internet]. Open Source Epidemiologic Statistics for Public Health. (Available from:https://www.openepi.com/Menu/OE_Menu.htm, accessed [2022 Jan 12])
8. Krishnamoorthy Y, Vijayageetha M, Kumar Sg, Rajaa S, Rehman T. Prevalence of malnutrition and its associated factors among elderly population in rural Puducherry using mini-nutritional assessment questionnaire. J Fam Med Prim Care. Medknow; 2018;7:1429.
9. Alwar V, Reethi K, Rameshkumar K. Geriatric anemia: An Indian perspective. Indian J Hematol Blood Transfus. 2013;29:126–127.
10. Mathew AC, Das D, Sampath S, Vijayakumar M, Ramakrishnan N, Ravishankar SL. Prevalence and correlates of malnutrition among elderly in an urban area in Coimbatore. Indian J Public Health. 2016 Apr 1;60:112–117.
11. Patel KV. Epidemiology of anemia in older adults. Semin Hematol. 2008; 45:210-7.
12. WHO. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, 2011 (WHO/NMH/NHD/MNM/11.1) (http://www.who.int/vmnis/indicators/haemoglobin.pdf, accessed [2022 Jan 21]).
13. Kirkwood BR, Sterne. JAC. Essential Medical Statistics. Massachusetts: Blackwell Science Ltd; 2003.
14. Amarya S, Sabharwal M, Singh K. Changes during aging and their association with malnutrition. Journal of Gerontology and Geriatrics.2015;6:78-84
15. Evans C. Malnutrition in the Elderly: A Multifactorial Failure to Thrive. Perm J. Kaiser Permanente; 2005;9:38.
16. Ferdous T, Kabir ZN, Wahlin A, Streatfield K, Cederholm T. The multidimensional background of malnutrition among rural older individuals in Bangladesh—a challenge for the Millennium Development Goal. Public Health Nutr. 2009;12 :2270-8.
17. Damayanthi, H.D.W.T., Moy, F.M., Abdullah, K.L. et al. Prevalence of malnutrition and associated factors among community-dwelling older persons in Sri Lanka: a cross-sectional study. BMC Geriatr.2018;18: 199.
18. Vafaei Z, Mokhtari H, Sadooghi Z, Meamar R, Chitsaz A, Moeini M. Malnutrition is associated with depression in rural elderly population. J Res Med Sci. 2013 Mar;18(Suppl 1):S15-9.
19. Agbozo F, Amardi-Mfoafo J, Dwase H, Ellahi B. Nutrition knowledge, dietary patterns and anthropometric indices of older persons in four peri-urban communities in Ga West municipality, Ghana. Afr Health Sci. 2018;18 :743-755.
20. Shahar D, Shai I, Vardi H, Fraser D. Dietary intake and eating patterns of elderly people in Israel: who is at nutritional risk? Eur J Clin Nutr 2003 571. Nature Publishing Group; 2003;57:18–25.
21. Little M, Zivot C, Humphries S, Dodd W, Patel K, Dewey C. Burden and Determinants of Anemia in a Rural Population in South India: A Cross-Sectional Study. 2018; 18:9.

Strain and Burden among Caregivers of Stroke Survivors in Punjab: A Cross-Sectional Study

Mohit Sharma[1], Shivesh Devgan[2], Sanjeev Mahajan[3]

[1]Associate Professor, Department of Community Medicine, Punjab Institute of Medical Sciences, Jalandhar, Punjab, India.
[2]Assistant Professor, [3]Professor and Head, Department of Community Medicine
Government Medical College, Amritsar, Punjab, India.

Correspondence : Dr. Shivesh Devgan, Email : shiveshdevgan@gmail.com

Abstract:

Introduction: Caregivers may feel stressed and burdened while caring for a stroke survivor. However, very few studies have assessed the burden among caregivers of Indian stroke patients. **Objectives**: The present study was done to assess the magnitude and predictors of strain and burden among caregivers of stroke survivors discharged from a tertiary care hospital in Punjab, India. **Method:** This cross-sectional study included consecutive newly diagnosed stroke patients from January 2021 till April 2022 at a tertiary care teaching hospital in Amritsar, India. The level of strain and burden among the caregivers was assessed using the Caregiver's strain index (CSI) and Zarit Caregiver Burden Scale (ZCBS) respectively. A minimum sample size of 110 stroke patients was calculated. Odds ratios were calculated for identifying predictors of strain and burden among caregivers using multivariate regression analysis. **Results:** Mean CSI for all caregivers was 6.67 ± 1.81. Using a cut-off of ≥ 7, authors found 40.2% of the caregivers to have great strain. Modified rankin scale (mRS) at the time of interview (AOR = 2.77, p value = 0.0063), presence of comorbidities in the patient (AOR = 3.07, p value = 0.023 and caregiver being female (AOR = 2.96, p value = 0.036) to be significantly associated with higher odds of having great strain. Using ZCBS, 18.1% had minimal burden, 53.5% had mild to moderate burden, 24.4% had moderate to severe burden and 3.9% had severe burden. mRS at the time of interview (AOR = 5.38, p value = 0.0048), presence of comorbidities in the patient (AOR = 7.63, p value = 0.0031), caregiver being female (AOR = 9.67, p value = 0.0072) and not being at all confident to care (AOR = 4.94, p value = 0.013) to be significantly associated with higher odds of having great burden, while rural residence (AOR = 0.55, p value = 0.0011) was associated with lower odds of high burden. **Conclusion:** High strain was observed among 40.1% of the caregivers of Indian stroke survivors and 24.4% had moderate to severe burden. Thus, the strain and burden among caregivers of Indian stroke patients is very high.

Key Words : Caregiver burden, Recovery, Rehabilitation, Strain, Stroke

Introduction:

Caregiving can be defined as task-oriented assistance provided by individuals, usually family or friends,[1] with this assistance not being part of formal community support services. Emphasis of stroke rehabilitation has recently shifted from a stroke survivor focused to stroke survivor-caregiver dyad approaches, in recognition that caregivers play an essential role in preserving rehabilitation gains and the long-term well-being of stroke survivors.[2] During

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Sharma M, Devgan S, Mahajan S. Strain and Burden among Caregivers of Stroke Survivors in Punjab : A Cross-Sectional Study. Healthline. 2023; 14 (3): 201-209
	DOI : 10.51957/Healthline_ 488_2023	

the period leading to hospital discharge, family caregivers of stroke survivors may face immense uncertainties and new challenges.[3] The caregivers must learn to cope with their concurrent grief and an uncertain future. Thus, the sudden need to care for a stroke survivor can be emotionally difficult and physically challenging. Caregivers are often unaware of their new role, unfamiliar with the disease, its progression, and the kinds of community support options available.[4]

This can result in strain and burden among caregivers. Caregiver burden refers to alterations in caregivers' emotional and physical health which can occur when care demands outweigh available resources,[5] the extent to which caregivers feels their emotional, physical, social life, and financial status has suffered as a result of caregiving.[6] Caregiver burden is associated with negative outcomes for both caregivers and patients, including the reduction of their general health and quality of life.

There is a dearth of Indian studies aimed at understanding the complex and multi-layered phenomenon of care giving after stroke. The present study was done to assess the magnitude and predictors of strain and burden among caregivers of stroke survivors discharged from a tertiary care hospital in Punjab, India.

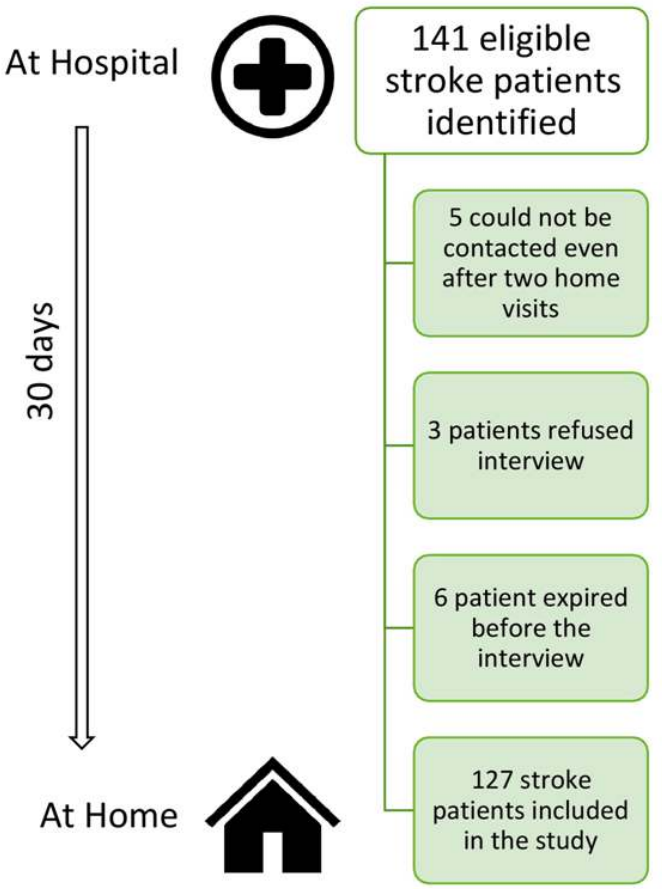
Method:

A cross-sectional study among stroke survivors and their caregivers was done by including consecutive newly diagnosed stroke (ischemic and haemorrhagic) patients identified in the emergency or medicine indoor ward of a tertiary care teaching hospital in Amritsar, India. Patients admitted during January 2021 till April 2022 were included in the study. The diagnosis of stroke was supported in every case by expert clinical opinion and Computed Tomography scan or Magnetic Resonance Imaging. Patients who recovered completely at the time of hospital discharge, expired during hospital stay, were unable to communicate, were unwilling to consent for participation in the study, or resided outside of the Amritsar district were excluded. Matolia and colleagues used CSI and reported high strain among 84% of the stroke caregivers.[7] Using the prevalence of caregiver strain as 0.84, α error of 5%, allowable error of 10% of 0.8, and sample size formula of $(Z\alpha/2)^2 \times (PQ)/E^2$, authors calculated the same size of a minimum of 81 patients. Adding 10% non-response rate, minimum sample size calculated was 90 patients. Eligible patients and their families were approached during the hospital stay, were explained the purpose of the study and a written consent was obtained. Once they agreed to participate in the study, a convenient time of a day one month after discharge from the hospital was chosen for an interview at their residences. Caregiver was defined as a person who usually provided the most important long-term support during recovery and rehabilitation of the stroke patient. In case of more than one caregiver, the stroke patient was asked to identify the caregiver spending majority of the time caring for them. Approval of the Institutional Ethics Committee was sought for the whole research before the commencement of the study.

Data Collection:

The patients were interviewed using a pretested, semi-structured questionnaire. While still admitted in the hospital, clinical information was noted. Remaining parts of the questionnaire were filled at patient's residence. The severity of disability of the stroke patients was assessed using the modified rankin scale (mRS).[8] A score of 0 is no disability, 5 is disability requiring constant care for all needs and 6 is death. The level of strain among the caregivers was assessed using the Caregiver's strain index (CSI). It has a set of 13 questions about social stress (6 items), economy stress (3 items), and psychological stress (4 items) with dichotomous yes/no answers. Score ranges from 0 to 13, with a score of seven or more indicating great stress.[9] The burden among the caregivers was assessed using the Zarit Caregiver Burden Scale (ZCBS), which is a 29-item scale specifically designed to measure feelings of burden

Figure 1 : Flow chart depicting selection of patients in the study



experienced by the caregivers. Score of 0 to 20 denotes minimal or no burden, 21 to 40 denotes mild-to-moderate burden, 41 to 60 denotes moderate-to-severe burden, and 61 to 88 denotes severe burden.[10] All scales were translated to Punjabi (regional language) and reverse translated to check for consistency and validity of translation.

Statistical analysis:

The data were numerically coded and analysed in IBM SPSS Version 25.0. (Armonk, NY: IBM Corp). Frequency distribution tables were created for qualitative variables, while quantitative data were described as means and standard deviation. Sociodemographic variables of the patients and their caregivers associated with great strain (based on CSI) and moderate and severe burden (based on ZCBS) were analysed using logistic regression analysis after adjusting for the possible confounders. Predictor confounder variables reaching p value = 0.25 in the univariate analysis were entered into the multivariate regression model to calculate adjusted odds ratios (AOR). Odds ratios were calculated with 95% confidence intervals (CI) and p valueless than 0.05 was considered as statistically significant. Receiver Operating Characteristics (ROC) curves were made for both CSI and ZCBS.

Results:

During the study period, authors contacted 141 eligible stroke patients, of which 127 stroke patients were interviewed and included in the final analysis. (Figure 1) The mean age of the patients was 65.40 ± 7.88 years and 28% were females. At the time of admission, 43% and 28% of the patients had mRS score of>3 at the time of admission and at the time of interview respectively. Pre-existing comorbidities were present in 30% of the patients. Mean age of the caregivers was 38.39 ± 4.55 years, 65% being aged

Table 1: Baseline characteristics of the caregivers of stroke patients (N=127)

Variables	n (%)
Age group (years)	
20 to 40	83 (65%)
41 to 60	39 (31%)
More than 60	5 (4%)
Gender	
Female	50 (39%)
Male	77 (61%)
Marital status	
Married	112 (88%)
Single	15 (12%)
Type of residence	
Urban	90 (71%)
Rural	37 (29%)
Relation to stroke patient	
Son	65 (51%)
Daughter	32 (25%)
Wife	12 (9%)
Other	18 (15%)
Education level	
Illiterate	14 (11%)
Primary	25 (19%)
Middle	30 (24%)
High	42 (33%)
Intermediate	10 (8%)
Graduate/Professional	6 (5%)
Employed	
Yes	78 (61%)
No	49 (39%)
Previously seen a stroke patient	
Yes	25 (20%)
No	102 (80%)
How confident in providing care?	
Very confident	12 (10%)
Somewhat confident	98 (77%)
Not confident at all	17 (13%)

Problems encountered	
Do not have money	69 (54%)
Does not know how to care	65 (51%)
Patient‘s condition makes me sad	52 (41%)
Alone to care	44 (35%)
Difficult to find time for caring	34 (27%)
Treatment is not working	30 (24%)
Others	8 (6%)
Fears	
Weakness of the patient would not get better	72 (57%)
Not knowing the best form of care	56 (44%)
Patient‘s pain would not get better	46 (36%)
Patient would not survive	38 (30%)
Being the only one to care	38 (30%)
Not enough money to continue treatment	37 (29%)
Future of patient‘s dependents	20 (16%)
Others	3 (2%)

Table 2 : Caregiver burden according to Caregiver Strain Index (CSI) and Zarit's Caregiver Burden Scale (ZCBS) (N=127)

CSI components	**Mean ± SD (range)**
CSI social	2.94 ± 1.07 (1 to 3)
CSI economy	1.85 ± 0.76 (0 to 3)
CSI psychological	1.87 ± 0.78 (1 to 4)
CSI total	6.67 ± 1.81 (3 to 11)
Great strain according to CSI (≥7)	
Yes	51 (40.2%)
No	76 (59.8%)
ZCBS severity	
Minimal (0 to 20)	23 (18.1%)
Mild to moderate (21 to 40)	68 (53.5%)
Moderate to severe (41 to 60)	31 (24.4%)
Severe (61 to 88)	5 (3.9%)

Table 3: Multivariate logistic regression analysis of patient and caregiver factors associated with great strain on the caregivers based on CSI (N=127)

Factors	Unadjusted Odd's ratio	95% CI for OR		p value*	Adjusted Odd's ratios	95% CI for		p value
		Lower	Upper			Lower	Upper	
Stroke patient related factors								
Age	1.017	0.97	1.06	0.47	NA			
Female gender	1.16	0.53	2.57	0.71	NA			
mRS at admission	2.42	1.46	4.02	**0.011**	1.01	0.47	2.15	0.97
mRS at interview	3.16	1.89	5.28	**0.003**	2.77	1.36	5.66	**0.0063**
Comorbidities	4.66	2.07	10.48	**0.004**	3.07	1.17	8.02	**0.023**
Caregiver related factors								
Age	0.98	0.94	1.01	0.3	NA			
Female gender	2.59	1.24	5.41	**0.0023**	2.96	1.08	8.15	**0.036**
Single	1.83	0.62	5.41	0.27	NA			
Illiterate	1.13	0.36	3.48	0.82	NA			
Unemployed	0.59	0.28	1.25	**0.17**	0.43	0.16	1.17	0.11
Rural residence	1.41	0.64	3.03	0.39	NA			
Never seen a stroke patient	0.67	0.27	1.61	0.37	NA			
Confidence in caring								
Not at all confident	2.85	0.612	13.33	**0.18**	5.2	0.72	17.48	0.22
Somewhat confident	1.21	0.34	4.31	0.76	NA			

*variables with a p value of less than 0.25 on univariate analysis were included in the multivariate regression model

less than 40 years. (Table 1) It was observed that among the caregivers, 39% were females, 88% were married, 29% were from rural residence, 11% were illiterate and 39% were unemployed. Only 20% of the caregivers reported previously seeing a stroke patient, and of the total 10% were very confident in caring for a stroke patient. Most common problems among caregivers were 'not having enough money' (54%) and 'not knowing how to care' (51%). The most common fears among the caregivers were 'weakness of the patient not improving' (57%) and 'not knowing the best form of care' (44%).

Mean CSI for all caregivers was 6.67 ± 1.81, ranging from 3 to 11. Using a cut-off of ≥ 7, we found 40.2% of the caregivers to have great strain. (Table 2) On multivariate regression analysis, we found higher mRS at the time of interview [AOR = 2.77 (95% CI 1.36 to 5.66), p value =0.0063], presence of comorbidities in the patient [AOR = 3.07 (95% CI 1.17 to 8.02), p value =0.023] and caregiver being female [AOR = 2.96 (95% CI 1.08 to 8.15), p value = 0.036] to be significantly associated with higher odds of having great strain. (Table 3) Based on the model of these three factors, Receiver–operating characteristic (ROC) curve was created, which had an Area Under Curve (AUC) of 0.79 ± SE0.04 (95% CI 0.71 to 0.88), p value = 0.00081. (Figure 2) This demonstrates high accuracy of these three factors in predicting high strain among stroke caregivers.

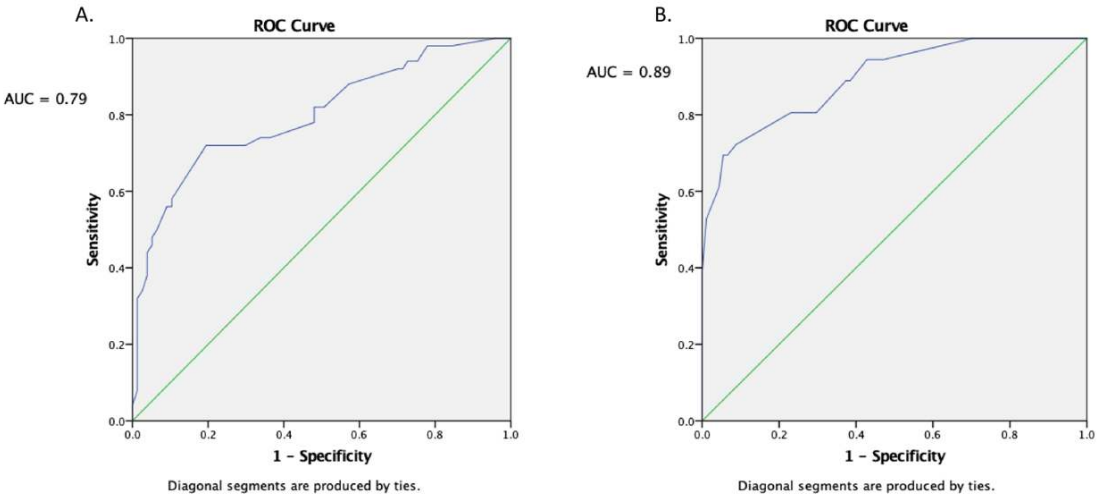
Using ZCBS, 18.1% had minimal burden, 53.5% had mild to moderate burden, 24.4% had moderate to severe burden and 3.9% had severe burden. (Table 2) On multivariate regression analysis, authors found higher mRS at the time of interview [AOR = 5.38 (95%

Table 4: Multivariate logistic regression analysis on factors associated with moderate and severe burden on the caregivers based in Zarit's Caregiver Burden Scale

Factors	Unadjusted Odd's ratio	95% CI for OR		p value*	Adjusted Odd's ratios	95% CI for		p value
		Lower	Upper			Lower	Upper	
Stroke patient related factors								
Age	1.01	0.96	1.06	0.51	NA			
Female gender	1.47	0.63	3.42	0.36	NA			
mRS at admission	2.99	1.66	5.38	**0.0052**	1.01	0.36	2.76	0.99
mRS at interview	4.77	2.51	9.05	**0.0032**	5.38	2.02	14.29	**0.0048**
Comorbidities	8.96	3.72	21.54	**0.0047**	7.63	2.25	25.89	**0.0031**
Caregiver related factors								
Age	0.99	0.95	1.03	0.86	NA			
Female gender	7.25	3.05	17.24	**0.0063**	9.67	2.69	14.79	**0.0072**
Single	1.3	0.41	4.12	0.64	NA			
Illiterate	1.47	0.45	4.72	0.51	NA			
Unemployed	0.73	0.32	1.63	0.44	NA			
Rural residence	0.38	0.14	1.02	**0.057**	0.55	0.13	0.94	**0.0011**
Never seen a stroke patient	0.64	0.25	1.61	0.34	NA			
Confidence in caring								
Not at all confident	1.57	0.35	6.99	0.25	4.94	1.22	6.62	**0.013**
Somewhat confident	0.4	0.11	1.41	0.15	1.16	0.21	6.6	0.86

*variables with a p value of less than 0.25 on univariate analysis were included in the multivariate regression model

Figure 2: ROC curves for predictors associated with great strain and moderate and severe burden on caregivers of stroke survivors



A. ROC for factors associated with high strain on CSI (mRS at interview, patients with comorbidities, female caregiver, rural residence and caregiver not at all confident)
B. ROC for factors associated with moderate and severe burden based on ZCBS (mRS at interview, patients with comorbidities and female caregiver)

CI 2.02 to 14.29), p value = 0.0048], presence of comorbidities in the patient [AOR = 7.63 (95% CI 2.25 to 25.89), p value = 0.0031], caregiver being female [AOR = 9.67 (95% CI 2.69 to 14.79), p value = 0.0072]and not being at all confident to care [AOR = 4.94 (95% CI 1.22 to 6.62), p value = 0.013] to be significantly associated with higher odds of having great burden, while rural residence [AOR = 0.55 (95% CI 0.13 to 0.94), p value = 0.0011] was significantly associated with lower odds. (Table 4) Based on the model of these five factors, ROC curve was created, which had an Area Under Curve (AUC) of 0.89 ± SE0.03 (95% CI 0.83 to 0.95), p value = 0.0034. (Figure 2) This demonstrates high accuracy of these five factors in predicting severe burden among stroke caregivers.

Discussion:

In current study sample, approximately 40% of the caregivers had great strain while caring for stroke survivors. Higher disability severity (based on mRS), presence of comorbidities in stroke patients and caregiver being female were found to be significantly associated with higher odds of great strain. The tool used in the present study for assessing strain was CSI which incorporates social, economic and psychological stress. Using CSI, Kaur et al found that majority of the caregivers of stroke patients (73.5%) had severe strain of care and around one fourth (26.5%) were found to be having moderate level of strain.[11] Bhattacharjee et al identified younger age associated with higher caregiver burden.[12] Mandowara et al also found a weak correlation between increasing caregiver age and caregiver burden.[13] Mean age of caregivers in the study was 38 years, which was much lower than that in these two studies and could be the reason why we did not observe an effect of caregiver age on strain and burden.

The initial few weeks after discharge can put enormous burden on the caregiver. It is not only frustrating but can have a negative impact on patients' outcomes.[14] In addition, studies show that burden in caregivers of stroke patients will increase over time if the proper intervention is not provided.[15] A recent experimental pilot study from Iran showed that supportive home care program is effective in reducing caregiver burden and its domains.[16] Ideally, such supportive programs should be instituted in all discharge cases. However, due to scarcity of healthcare professionals in India, caregivers who have a high likelihood of severe burden should be identified, who should then be supported by a home care program. In this study, higher disability severity (based on mRS), presence of comorbidities in stroke patients, caregiver being female, rural residence and not being confident to care were found to be significantly associated with higher odds of moderate and severe caregiver burden. Future research is required to assess the impact of supportive home care program in reducing caregiver burden in Indian setting.

Gender disparity in caregiver strain and burden is evident in current study as female caregivers experienced higher strain and burden. Menon et al observed that female caregivers of stroke patients were subjected to more sleep disturbance, physical and psychological stress, faced more difficulty regarding the patient's bladder, bowel, personal hygiene needs, and physiotherapy. Female caregivers felt less motivated in caregiving than male counterparts and time spent and burden perceived was more by female caregivers.[17]In a patriarchal society like India, females are expected to make more physical and emotional adjustments while caring for a patient with chronic disease. In many cases, female caregivers would neglect their own health and give priority to the patient.[18] In addition, having a male stroke patient would shift the financial burden on the female members. Thus, educating the family about the importance of family support in reducing caregiver stress and burden by sharing caregiving responsibilities is essential.

Limitations:

Generalization of study findings is limited to Indian caregivers of stroke patients who sought treatment from a public tertiary care hospital. Perceived caregiver strain might be different for caregivers who are attending private outpatient

clinics. Secondly, authors did not assess caregiver comorbidity level in great detail, which could also affect their perceived strain and burden. Also, repeated measurements of caregiver strain and burden after discharge over a longer follow up period would provide a better understanding of the dynamic nature of these characteristics.

Conclusion:

The study found that 40.1% of the caregivers of Indian stroke survivors experience high strain and 24.4% had moderate and severe burden. High disability level, comorbid patients and female caregiver to be common factors associated with great strain and burden. Understanding these factors is a key step and a valuable tool toward the design of early intervention strategies for caregivers who are at risk of distress.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References:

1. Dewey HM, Thrift AG, Mihalopoulos C. Informal care for stroke survivors. Results from the North East Melbourne Stroke Incidence Study (NEMESIS). Stroke. 2002;33: 1028–1033.
2. McCullagh E, Brigstocke G, Donaldson N, Kalra L. Determinants of caregiving burden and quality of life in caregivers of stroke patients. Stroke 2005;36:2181-6.
3. Pringle J, Hendry C, McLafferty E. A review of early discharge experience of stroke survivors and their carers. J ClinNurs 2008;17:2384-97.
4. Cameron JI, Cheung AM, Streiner DL, Coyte PC, Stewart DE. Stroke survivors' behavioral and psychologic symptoms are associated with informal caregivers' experiences of depression. Arch Phys Med Rehabil 2006;87:177-83.
5. Given CW, Given B, Stommel M, Collins C, King S, Franklin S. The caregiver reaction assessment (CRA) for caregivers to persons with chronic physical and mental impairments. Res Nurs Health 1992;15:271-83.
6. Imarhiagbe FA, Asemota AU, Oripelaye BA, Akpekpe JE, Owolabi AA, Abidakun AO, et al. Burden of informal caregivers of stroke survivors: Validation of the Zarit burden interview in an African population. Ann Afr Med 2017;16:46-51.
7. Matolia RR, Anandwala K, Verma N. A Study to Measure Caregiver Stress in Stroke Patients using Caregiver Strain Index.International Journal of Health Sciences and Research 2022;12; (4):276-282.
8. Bonita R, Beaglehole R. Modification of Rankin Scale: Recovery of motor function after stroke. Stroke 1988;19:1497-500.
9. Robinson BC. Validation of a caregiver strain index. J Gerontol 1983;38:344-8.
10. Zarit SH, Reever KE, Bach-Peterson J. Relatives of the impaired elderly: Correlates of feelings of burden. Gerontologist 1980;20:649-55.
11. Kaur P, Kaur S, Bhalla A, Katyal P, Raavi, et al. Strain among the Family Caregivers of Patients with Stroke. J PerioperCrit Intensive Care Nurs2018;4:144.
12. Bhattacharjee M, Vairale J, Gawali K, Dalal PM. Factors affecting burden on caregivers of stroke survivors: Population-based study in Mumbai (India). Ann Indian AcadNeurol 2012;15:113-9.
13. Mandowara B, Patel AN, Amin AA, Phatak A, Desai S. Burden faced by caregivers of stroke patients who attend rural-based medical teaching hospital in western India. Annals of Indian Academy of Neurology. 2020;23(1):38.
14. Shiner CT, Vratsistas-Curto A, Bramah V, Faux SG, Watanabe Y. Prevalence of upper-limb spasticity and its impact on care among nursing home residents with prior stroke. DisabilRehabil. 2020;42(15):2170–7.
15. Kim EY, Yeom HE. Influence of home care services on caregivers' burden and satisfaction. J ClinNurs. 2016;25(11–12):1683–92.
16. AshghaliFarahani M, NajafiGhezeljeh T, Haghani S, Alazmani-Noodeh F. The effect of a supportive home care program on caregiver burden with stroke patients in Iran: an experimental study. BMC Health Services Research. 2021;21(1):1-0.
17. Menon B, Salini P, Habeeba K, Conjeevaram J, Munisusmitha K. Female caregivers and stroke severity determines caregiver stress in stroke patients. Ann Indian AcadNeurol 2017;20:418-24.
18. Campbell P, Wright J, Oyebode J, Job D, Crome P, Bentham P, et al. Determinants of burden in those who care for someone with dementia. Int J Geriatr Psychiatry 2008;23:1078-85.

Antenatal Care Services Utilization among the Antenatal and Postnatal Women in a Rural Area of South India: A Cross-Sectional Study

Sabari Raja N[1], Deepanchakravarthi V[2], Ashwini Madeshan[3], Gracy Paulin Dharmalingam[2]

[1]Associate Professor, [2]Assistant Professor, Department of Community Medicine, Government Thoothukudi Medical College, Thoothukudi, Tamilnadu, India,

[2]Assistant Professor, Department of Community Medicine, Sri Siddhartha Medical College, Tumakuru, Karnataka, India

Correspondence : Dr. Gracy Paulin Dharmalingam Email : gpaulin90@gmail.com

Abstract:

Introduction: Timely and quality antenatal care is a crucial determinant towards the prevention of maternal mortality, which is a significant developmental goal for developing countries, which contributes to more than 99% of maternal deaths worldwide. However, the lack of equitable access to quality ANC is a major challenge in resource-limited settings, particularly in developing countries like India. **Objectives:** To assess the utilization rates of antenatal care services among antenatal women and postnatal women and to determine the factors responsible for under or non-utilization of antenatal care services (ANC). **Method:** The present study was conducted for a period of four months among antenatal and postnatal women in a rural area of South India. All antenatal and postnatal women except those who were not willing to participate and those who had MTP/abortion during the present pregnancy were included for the study. A pre tested semi structured questionnaire was used for collecting information regarding ANC utilization. Data was entered in Microsoft Excel and analyzed for descriptive and inferential statistics. **Results:** A total of 175 (125 antenatal and 50 postnatal) women were interviewed. Among them, 90.3% (92% antenatal and 86% postnatal) women had completely utilized ANC services. Among the postnatal women, those who had completely utilized ANC services, 11.6% had complications at the time of their delivery and those who had incompletely utilized ANC services, 57.1% had complications. The difference was found to be statistically significant ($p<0.05$).Only 87.4% women were covered in home visits and 28.6% of them were not given any prenatal advice. IFA tablets were taken adequately only by 57.7% women. **Conclusion:** The present study revealed that most of the women were aware about the antenatal services available and had registered their pregnancy early. Td immunization was done at right time. However antenatal home visits were not effectively implemented.

Key words : Facilities and Services Utilization, India, Pregnant Women

Introduction:

Antenatal care (ANC) is the health care provided to women who are pregnant, for confirmation and monitoring of the progress of their pregnancy, and to promote their birth preparedness and complication readiness for ensuring optimal birth outcomes for both the mother and her baby. Timely and quality antenatal care is a crucial determinant towards the prevention of maternal mortality, which is a significant developmental goal for developing countries, which contributes to more than 99% of maternal deaths worldwide.[1]The essential components of quality ANC include early registration of pregnancy, a minimum of four antenatal visits

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Raja S, Chakravarthi D, Madeshan A, Dharmalingam G. Antenatal Care Services Utilization among the Antenatal and Postnatal Women in a Rural Area of South India: A Cross-Sectional Study. Healthline. 2023; 14 (3): 210-218
	DOI : 10.51957/Healthline_ 548_2023	

during each pregnancy interspersed over the three trimesters, tetanus toxoid immunization (Td), and iron/ folic acid supplementation (IFAS). During antenatal visits, pregnant women should receive appropriate nutrition and health education, undergo clinical and laboratory tests for monitoring maternal and fetal well-being, and evaluated for the early detection of any abnormalities along with their management and referral, as required. However, the lack of equitable access to quality ANC is a major challenge in resource-limited settings, particularly in developing countries.[2]In India, the second most populous country with the largest reproductive cohort, results of a large-scale nationwide NFHS-5 survey in 2019-21 revealed that antenatal registration in their first trimester was 67.9% among rural women.[3]

The health and survival of newborn children is closely linked to that of their mothers. Many reports have shown that both mothers and newborn have a better chance of survival if they got skilled help at birth. Adult pregnant women are more likely to utilize ANC as compared to adolescent pregnant women, and a number of socioeconomic and demographic factors like education, employment, income, and place of residence, geographical variations, birth order, and parity explain the differences in utilization of ANC services among adolescent and adult pregnant women.[4]Maternal mortality is 97 per 100,000 live births in India according to SRS 2018-20.[5]They seek to provide universal access to equitable, affordable and quality maternal health care, as well as to bring about an improvement in the health status of the pregnant women belonging to underprivileged sections of the society.[6]

In this perspective, the present study is conducted to assess the utilization of antenatal care services utilization among the antenatal and postnatal women in a rural area of Thoothukudi, Tamil Nadu.

Method:

The present study was conducted in a rural field practice area of Pudhukottai RHTC (Rural Health and Training Center) attached to the Department of Community Medicine, Government Thoothukudi Medical College, Thoothukudi, Tamil Nadu. The study was conducted for a period of four months from January to April 2023. The list of antenatal and postnatal women (women who are in their puerperal period of 42 days postpartum) in the rural field practice area was obtained from the Anganwadi centers in the area.

All pregnant women whose pregnancy status has been confirmed by Urine Pregnancy Test/Ultrasound, with gestational age upto 37 weeks staying either in their husband's place / mother's place were included in the study. Similarly, postnatal women who were staying either in their husband's place or mother's place were included in the study. Those women who were not willing to participate in the study and who were with any psychiatric disorders taking drugs during the study period were excluded from the study. Those women who had MTP/ Abortion during present pregnancy and those who had stayed during their entire pregnancy period in any other area which does not come under present study area and had come to the study area only after their delivery were also not included in the study.

House to house visit was done to all antenatal and postnatal women included in the study. A pre-designed, pre-tested semi structured questionnaire which includes information on various components of antenatal care services along with socio-demographic variables was developed specifically for this study. It was pilot tested and the necessary changes were incorporated in it. The Questionnaire consisted of two sections:

I) General information (personal data, family composition and socio-economic status)

ii) Specific information regarding the utilization of various components of antenatal care services.

Primary data was obtained from the study subjects using the questionnaire. Ethical Committee approval was taken before conducting the study. Informed oral consent was obtained from the study

subjects before collecting the data after giving adequate information regarding the nature, purpose and explaining the benefits of the study in the local language. Data was entered in Microsoft Excel and analyzed. Results are expressed in percentages and proportions. Association between socio-demographic variables and other variables with utilization of antenatal care services was tested using appropriate test of significance.

Adequate Antenatal visits (ANC Visits):

Once a month in first 7 months, twice a month in next month and every week till 37 weeks of gestation is considered as adequate antenatal visits.[6]In this study, pregnant women considered having adequate antenatal visits if she had done the above mentioned visits as per her present gestational age at the time of interview. In postnatal women, all the above mentioned visits completed is considered as adequate visits.

Adequate IFA (Iron and Folic Acid) Tablets:

Those pregnant women who were consuming IFA tablets daily (1 tablet per day) in their second and third trimester as per their gestational age were considered as adequate consumption of IFA tablets. In Postnatal women, those who had consumed >180 IFA tablets were taken as adequate.

Results:

A total of 185 (132 pregnant women and 53 postnatal women had registered in the RHTC field practice area during the study period. Among them, 3 pregnant women were taking anti-psychotic drugs and 6 (4 pregnant women and 3 postnatal women) were not willing to participate in the study. Out of the remaining 175 study participants,125 (71.4%) were pregnant women in the antenatal period and the remaining 50 (28.6%) were in their puerperal period. Among 125 pregnant women, 36 (28.9%) were in first trimester, 62 (49.6%) in second trimester and 27 (21.6%) in third trimester. The socio- demographic profile of the study participants is shown in Table 1.

Among the total 175 women participated, 55 (31.4%) had high risk pregnancy. Anemia was the most common complication (41.8%) and anemia was also a coexistent complication followed by GDM (10.9%) and previous LSCS (9.1%). Out of the 55 high risk pregnancy study participants, 62% were referred to the tertiary care hospital for further management of the disease and all of them visited the tertiary care hospital regularly. In the study, 142 (81.1%) out of 175 study subjects have registered their pregnancy earlier in first trimester followed by 18.9% registration in their second trimester. All 125pregnant women had adequate antenatal visits according to their gestational age and all postnatal women had adequate antenatal visits during their antenatal period)to the PHC (every Tuesdays) and if necessary to the tertiary care hospital for their routine checkups. Among them, 132 (75.4%) were completely immunized with two doses of Td vaccine and 101 (57.7%) had consumed adequate number of IFA tablets (depending upon their gestational age). Among those women who had not consumed adequate IFA tablets or even a single tablet, the main reason (70.3%) was found to be adverse effects like nausea and vomiting. None reported that they were not issued IFA tablets by the health workers. Majority of the study participants (87.4%) were covered for antenatal home visits during their antenatal period by the health workers of the PHC. Only 125 (71.4%) women received prenatal advice regarding diet and drugs (36%), avoiding heavy work (18.3%), warning signs (9.7%) and birth preparedness (7.4%) (Table 2)

In the present study, 80.32% had completely utilized ANC services i.e. early registration of pregnancy in first trimester, adequate number of ANC visits, complete Td immunization, adequate number of IFA tablets consumption and atleast 3 antenatal home visits. (Table 3)

It was observed that among the socio-demographic factors, age and occupation was found to be significantly associated with the utilization of ANC services. (p value<0.05). (Table 4)Among the

Table 1 : Socio-demographic details of the study participants (N=175)

Characteristic	Category	Frequency	Percentage
Age group of the participants(years)	18-20	19	10.9
	21-23	62	35.5
	24-26	54	30.8
	27-29	27	15.4
	≥30	13	7.4
Religion	Hindu	123	70.3
	Christian	42	24
	Muslim	10	5.7
Education of the participants	Illiterate	3	1.7
	Primary School	14	8
	Middle School	32	18.3
	High School	41	23.4
	Higher Secondary (PUC*)	45	25.7
	Graduate	40	22.9
Occupation of the participants	House makers	98	56
	Unskilled	43	24.6
	Semi skilled	20	11.4
	Skilled	14	8
Type of Family	Nuclear	93	53.1
	Joint	63	36
	Three Generation	19	10.9
Socio-economic status (Modified B.G.Prasad socio-economic scale)	Class I	50	28.6
	Class II	41	23.4
	Class III	46	26.3
	Class IV	35	20
	Class V	3	1.7

* PUC – Pre-university College

occupation, majority of the study subjects (24.6%) were coolie workers (unskilled) for daily wages.

Among the illiterates, all women had completely utilized the ANC services. Among the literates, only 5.4% had incompletely utilized ANC services. However, this was found statistically not significant. It was observed that among those who received prenatal advice on various components of antenatal care, only 11.2% had incompletely utilized ANC services. Among those who had not received prenatal advice 6% women had incompletely utilized ANC services. This was found to be statistically not significant. (Chi square = 1.1, df-1, p=0.29)

The present study showed that among study subjects who had completely utilized ANC services, 11.6% had complications like cord around the neck at

Table 2: Distribution of the study participants according to their utilization of various components of antenatal care services (n=175)

Antenatal care (ANC) services		Antenatal Women (n = 125)	Postnatal Women (n = 50)	Total (n = 175)
		n (%)	n (%)	N (%)
Registration of pregnancy	First Trimester	100(80%)	42(84%)	142(81.1%)
	Second Trimester	25(20%)	8(16%)	33(18.9%)
	Third Trimester	0(0%)	0(0%)	0(0%)
Antenatal Visits	Adequate	125(100%)	50(100%)	175(100%)
	Inadequate	0(0%)	0(0%)	0(0%)
Td Immunization Status	Completely Immunized	92(73.6%)	40(80%)	132(75.4%)
	Incompletely Immunized	33(26.4%)	10(20%)	43(24.6%)
	Not Immunized	0(0%)	0(0%)	0(0%)
Iron and Folic Acid (IFA) tablets consumption	Adequate number of IFA consumed	70(56%)	31(62%)	101(57.7%)
	Inadequate number of IFA consumed	53(42.4%)	15(30%)	68(38.9%)
	Not consumed even a single IFA Tablet	2(1.6%)	4(8%)	6(3.4%)
Reason(s) for inadequate/non consumption of IFA tablets	Adverse effects (nausea and vomiting)	37(67.3%)	15(78.9%)	52(29.7%)
	Does not like the IFA tablets	18(32.7%)	4(21.1%)	22(12.6%)
	Not issued by VHN/MO	0(0%)	0(0%)	0(0%)
Prenatal advice	Not given	33(26.4%)	17(34%)	50(28.6%)
	Given	92 (73.6%)	33 (66%)	125 (71.4%)
Antenatal Home Visit	Yes	110(88%)	43(86%)	153(87.4%)
	No	15(12%)	7(14%)	22(12.6%)

the time of their delivery and among those who had incompletely utilized, 57.1% had complications (PPH, Sepsis). This difference was found to be statistically significant. (Chi square with Yates correction = 5.6, df-1, p=0.17 (Table 5)

Discussion:

In the present study, all the women had registered their pregnancy and 81.1% of them had done early registration. This is higher than NFHS-5 factsheet data where early registration in first

Table 3: Distribution of the study participants based on their overall utilization status of antenatal care services (n=175)

Utilization status of ANC services	Antenatal Women	Postnatal Women	Total
	n (%)	n (%)	n(%)
Complete	115 (92)	43 (86)	158 (90.3)
Incomplete	10 (8)	7 (14)	17 (9.7)
Total	125 (100)	50 (100)	175 (100)

Table 4: Distribution of Utilization status of ANC services based on various socio demographic profiles, prenatal advice and birth order (n=175)

Parameters		ANC services utilization		Total (N=175)	p value
		Complete n(%)	Incomplete n(%)		
Age Groups	18 to 23 years	68 (84)	13(16)	81	0.028*
	24 to 29 years	78 (96.3)	3 (3.7)	81	
	≥30 years	12 (92.3)	1 (7.7)	13	
Literacy status	Illiterate	3 (100)	0 (0)	3	1.000
	Literate	155 (90.1)	17 (9.9)	172	
Occupation of subjects	House makers	95 (97)	3 (3)	98	0.001*
	Working women	63 (81.8)	14 (18.2)	77	
Type of family	Nuclear	85 (91.4)	8 (8.6)	93	0.207
	Joint	58 (92)	5 (8)	63	
	Three generation	15 (78.9)	4 (21.1)	19	
Socio Economic Status	Upper & middle	125 (91.2)	12 (8.8)	137	0.418
	Lower class	33 (86.8)	5 (13.2)	38	
Prenatal advice	Yes	111 (88.8)	14 (11.2)	125	0.294
	No	47 (94)	3 (6)	50	
Birth Order	Primigravida/ primipara	81 (91)	8 (9)	89	0.742
	Multigravida/ multipara	77 (89.5)	9 (10.5)	86	

* Significant at p value < 0.05

Table 5: Distribution of Complications among post Postnatal women based on utilization status of ANC services

Utilization status of ANC services	Postnatal Women (n=50)			Chi square (p value)
	Complications			
	Yes (%)	No (%)	Total	
Complete	5 (11.6)	38 (88.4)	43	$X^2 = 5.6$, df-1, p=0.017
Incomplete	4 (57.1)	3 (42.9)	7	
Total	9	41	50	

trimester is done only by 67.9% women.[3]In Mahajan H et al, early registration was found in 8.3% of the study subjects.[7]Similarly in studies done by Paudel DP et al 94.8%[8] and Patel K et al 100% [9] had registered their pregnancy early in first trimester.All the women in the study (100%) had adequate number of antenatal visits (>4 visits)as in the studies done by Ansari AM et al 25.6%[10] and in Singh P et al 62.0% [11] had more than recommended minimum four antenatal visits. This is also higher than the NFHS-5 data where minimum antenatal visits were done by only 54.2% women.[3]

In the present study 90.3% (92% pregnant women and 86% postnatal women) of the study subjects had completely utilized antenatal care services. In the studies done by Chimankar DA et al 20%[12] and Patel K et al 97.3%[9] of the rural women had received full ANC. In a study done by Sadiq N et al in a rural area of Pakistan where overall utilization was 84.4%.[13]Reasons could be due to increasing awareness among the rural women about the availability and utilization of ANC services through mass media and also because of AWWs, ANMs, ASHA worker, as they play an important role not only in creating awareness among them but also motivating them to avail ANC services and other reason could be due to increasing primary health care coverage making easy accessibility of necessary ANC services to the rural women.

Regarding Td immunization among the participants, 75.4% were completely immunized with 2 doses and 24.6% were partially immunized. This finding was lower than the finding of Dabade KJ et al[14], in which they reported 98.6% coverage and a study conducted in Punjab which showed 98.4%[15]. Adequate IFA supplementation was received by 57.7% of the women, which was significantly higher than a study done in a tertiary care hospital in Haryana where 21% of women did not consume any IFA tablets. [16]

In the present study, 56% of the antenatal women had consumed adequate number of IFA tablets (>180 days). This is higher when compared to NFHS-5 where its only 22.7%[3]In the studies conducted by Mahajan H et al 34.6%,[7] Ansari AM et al[10] and Singh P et al 73.0%[51] none of them had even consumed atleast 100 IFA tablets.Among the postnatal women, 62% of the study subjects had consumed adequate number of IFA. In the other studies done by Chimankar DA et al 21.1%,[12] Paudel DP et al 66.5%,[8] Patel K et al 100%,[9]Dabade KJ et al 17.5%,[14] Sharma V et al 92.4%,[17]and Ansari AM et al 7.6%[10] had consumed 100 or more than 100 tablets. But in the present study, increased awareness regarding the importance of consuming IFA tablets by various means could be an important reason for higher percentage of women consuming IFA tablets. The reasons for not consuming IFA tablets were side effects like nausea, vomiting followed by lack of willingness to consume tablets. In the study conducted by Ansari AM[10] et alonly some of the study subjects had mentioned vomiting, loose motion and bad taste as the reasons and majority were not able to mention the reasons for not consuming the IFA tablets. In the present study overall 28.4%of the study subjects had received prenatal advice on various components of antenatal care services**.** In a study conducted by Varma GR et al, 73.7% of rural women had received prenatal advice.[18] In another study done by Sharma V et al 100% had received prenatal advice,78.9% had received advice on dangerous signs in pregnancy and 21.1% on diet.[17]

It was observed that ANC services utilization is significantly associated with age group and occupation of the study subjects while no statistically significant association was found with literacy rate, type of family, socio economic status, and prenatal advice and birth order. This was consistent with finding of studies did in different parts of the country. Theutilization was more (96.3%) among women aged above 24to 29 years followed by above 30 years (92.3%).This is similar to studies conducted by Chimankar DA et al[12] and Roy MP et al,[16]and a systematic review done in developing countries by Simkhada B et al.[19] but this finding was not in agreement to the study conducted by Sharma V et al

in Lucknow,[17] and also study done in rural West Sumatra Indonesia by Agus Y et al[20] where they found reduction in percentage of women utilizing ANC services with increasing age. Increased utilization among women aged 24 to 29 years could be due to increased awareness. In contrary there may be lesser utilization among women aged above 30 years (particularly if they are multigravida/ multipara) as they will be less cautious and less anxious about their pregnancy as they had children before and do not pay heed towards the importance of antenatal care.

The present study revealed more utilization among the 3 illiterates than literates These findings were in contradictory to other studies conducted by Chimankar DA et al,[12] Roy MP et al,[16] Singh P et al[11] and Jat TR et al,[21] where better utilization was seen among women with higher education. Also, the utilization rate was higher among housemakers (97%) when compared to the working women (81.8%). This is in accordance with studies conducted by Chimankar DA et al,[12]Sharma V et al[17]

Percentage of women completely utilized ANC services was almost same in primigravida (91%) and multigravida (89.5). This was in contrast to studies conducted by Chimankar DA et al,[12] Sharma V et al[17]and Jet TR et al.[21] As primigravida will be more anxious and cautious about their pregnancy, they tend to give more antenatal visits and utilize ANC services completely when compared to multigravida. But this was contradictory to study done by Agus Y et al in Indonesia, where reduced utilization was seen among primigravida than among multigravida.[20]

Conclusion:

The present study assessed the Antenatal care services utilization among the antenatal and postnatal women in a rural area of Thoothukudi. Results revealed that most of the women were aware about the antenatal services available. Most of the women have registered their pregnancy at first trimester itself and complete Td immunization done in 75.4% women. IFA tablets were taken adequately only by 57.7% women and 3.4% did not consume any IFA tablets. Further antenatal home visits by health were not effectively implemented.

Acknowledgment:

The authors thank all the antenatal and postnatal women who had participated in the study.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References:

1. Rustagi R, Basu S, Garg S, Singh MM, Mala YM. Utilization of antenatal care services and its sociodemographic correlates in urban and rural areas in Delhi, India. Eur J Midwifery. 2021 Sep 10;5:40. doi: 10.18332/ejm/140459. PMID: 34585106; PMCID: PMC8431095.
2. Chandhiok N, Dhillon BS, Kambo I, Saxena NC. Determinants of antenatal care utilization in rural areas of India: A cross-sectional study from 28 districts. J ObstetGynecol India 2006: 47-52.
3. National Family Health Survey 5 (2019-21) Fact sheet. [cited 2023 July 18]; Available from: URL: http://rchiips.org/nfhs/NFHS-5_FCTS/India.pdf
4. Fulpagare PH et al. Antenatal Care Service Utilization Among Adolescent Pregnant Women–Evidence. Swabhimaan Programme in India. Front. Public Health 2019;7:369.
5. Sample Registration System 2018-20; Special Bulletin on Maternal Mortality in India. [cited 2023 September 14]; Available from:https://censusindia.gov.in/census.website/data/SRSMMB
6. Park K. Park's Text book of Preventive and Social Medicine. 27th ed. Jabalpur: M/s BanarsidasBhanot publishers; 2023.
7. Mahajan H, Sharma B. Utilization of Maternal and Child Health Care Services by Primigravida Females in Urban and Rural Areas of India. ISRN Preventive Medicine 2014;1-10.
8. Paudel DP, Nilgar BR, Bandhankar M. Antenatal care service utilization and contributing factors: a community based study in rural Belgaum, Karnataka, India. IOSR J Dent Med Sci 2013 Jul-Aug;9(3):25-31.
9. Patel K, Baghel R, Renuka M. A Cross sectional study to assess Utilization level of Antenatal Services among Rural Women in the reproductive age group. MedicaInnovatica 2013 Dec;2(2):16-21.
10. Ansari AM, Khan Z. Antenatal care services in rural areas of Aligarh district, India: A cross sectional study. J Public Health Epidemiol 2011 May;3(5):210-6.
11. Singh P, Yadav RJ. Antenatal Care of Pregnant Woman in India. Indian J Community Med 2000 Jul-Sep;25(3):112-7.
12. Chimankar DA, Sahoo H. Factors influencing the Utilization of Maternal Health Care Services in Uttarakhand. Ethno Med 2011;5(3):209-16.

13. Sadiq N, Waheed Q, Hussain M, Rana AT, Yousaf Z, Chaudry Z et al. Factors affecting the utilization of antenatal care among women of reproductive age in NurpurShahan. J Pak Med Assoc. 2011 Jun;61(6):616-8.
14. Dabade KJ, Dabade SK, Khadilkar HA. A Study on Utilization of Maternal Health Care Services in Rural Area of Aurangabad District, Maharashtra. Natl J Community Med 2013; 4(4):579-83.
15. Gill KP, Devgun P. Socio-demographic Factors Influencing Antenatal Care Practices in Urban Slums of Amritsar city, Punjab, India. Natl J Community Med 2013 Oct – Dec;4(4):574-8.
16. Roy MP, Mohan U, Singh SK, Singh VK, Srivastava AK. Determinants of Utilization of Antenatal Care Services in Rural Lucknow, India. J Fam Med Primary Care 2013 Jan;2(1):55-9.
17. Sharma V, Mohan U, Das V, Awasthi S. Utilization pattern of antenatal care in Lucknow under National Rural Health Mission. Indian J Community Health 2012 Jan-Mar; 24(1):32-6.
18. Varma GR, Kusuma YS, Babu BV. Antenatal care service utilization in tribal and rural areas in a South Indian district: an evaluation through mixed methods approach. J Egypt Public Health Assoc 2011 April;86(1and 2):11-5.
19. Simkhada B, Teijlingen ER, Porter M, Simkhada P. Factors affecting the utilization of antenatal care in developing countries: systematic review of the literature. J AdvNurs 2008 Feb;61(3):244-60.
20. Agus Y and Horiuchi S. Factors influencing the use of antenatal care in rural West Sumatra, Indonesia. [cited 2023 July 5]; Available from: URL: http://www.biomedcentral.com/content/pdf/1471-2393-12-9.pdf.
21. Jat TR, Nawi N, Sebastian MS. Factors affecting the use of maternal health services in Madhya Pradesh state of India: a multilevel analysis. Int J Equity Health 2011 Dec 5;10(1):59.

Assessment and Correlation of Physical Activity and Mental Health Status of Medical Students at One of the Medical Colleges of Karnataka, India

Swathe P[1], Mayur Sherkhane[2]

[1]Post graduate student, [2]Professor, Department of Community Medicine, SDM College of Medical Sciences and Hospital, Shri Dharmasthala Manjunatheshwara University, Dharwad, Karnataka

Correspondence : Dr Mayur Sherkhane, Email : drmayurss@gmail.com

Abstract:

Introduction: Physical inactivity and the associated health problems pose a current and growing threat to public health. People with sedentary behaviour are at higher risk of suffering from symptoms of anxiety and depression. Medical students suffer very high levels of psychiatric illness, depression, suicide, dependence on alcohol and drug abuse. **Objectives:** 1. To assess the level of physical activity and mental health status among medical students. 2. To compare the mental health status in relation to the adequacy level of physical activity among them. **Method:** Cross-sectional study was conducted among 145 undergraduate medical students. Data was collected using pre-tested and pre-designed proforma. International Physical activity Question naire short form (IPAQ-SF) and General Health Questionnaire-12 (GHQ-12) were used to assess level of physical activity and mental health status, respectively. Statistical analysis was done using SPSS version 27.0.Descriptive statistics and chi-square test was applied. **Results:** Among 145 medical students, 60% and 16.55% were found to have moderate and low physical activity. Distress and psychological distress was found to be among 27.59%and 22.75% students. It was found that, 50% of the participants, who were doing low level of physical activity were found to be distressed, which was found to be statistically significant. ($\chi 2 = 10.826$, df = 4, p = 0.02859073). **Conclusion:** Physical activity and mental health are related proportionally. Regular physical activity has the potential to reduce anxiety, distress, and depression. Importance of physical activity, which has positive influence must be emphasised to reduce mental stress among medical students.

Key Words : Distress, Medical Student, Mental Health, Physical activity, Stress.

Introduction:

As per WHO, physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure.[1] Regular physical activity is proven to prevent and manage non-communicable diseases (NCDs) such as heart disease, stroke, diabetes and breast and colon cancer. It also helps to prevent hypertension, overweight/ obesity and can improve mental health, quality of life and well-being.[2]

Globally, women were less active than men accounting to 32% men and 23% women.[3] Around 1 in 3 women and 1 in 4 men do not do enough physical activity to stay healthy.[1] In high-income countries 41% of men and 48% of women were insufficiently physically active as compared to 18% of men and 21% of women in low-income countries (LICs).[4]

The term physical activity should not be confused with exercise, as it is a part/subgroup of physical activity. Exercise is planned, organized,

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Swathe P, Sherkhane M. Assessment and Correlation of Physical Activity and Mental Health Status of Medical Students at One of the Medical Colleges of Karnataka, India. Healthline. 2023; 14 (3): 219-224
	DOI : 10.51957/Healthline_ 535_2023	

repetitive movements carried out to maintain or improve health and fitness.[5] Physical inactivity is one of the leading risk factors for various NCDs, injuries and premature deaths worldwide and it also leads to shortening of life span by atleast 3 to 4 years.[6]

Mental health is an integral and essential component of health. WHO defines Mental Health as a state of well-being in which an individual realizes his or her own abilities, can work productively, can cope with the normal stresses of life and is able to make a contribution to his or her community.[7]

Mental health problems like depression increases the risk for many physical health problems, particularly long-lasting conditions like diabetes, hypertension, cardiovascular disease and stroke.[8] Young adults are prone for psychological and emotional distress due to a wide variety of factors, like intense academic pressure, increased workload, financial concerns, sleep deprivation.[9]

Sedentary Life style combined with increased energy intake, impairs both physical and mental capabilities and increases the risk of disease.[10] It was also found in an meta-analytic study that low physical activity is associated with a greater risk of depression.[11]

Student behaviour is considered a temporary part of college life and any unhealthy behaviour at this phase generally persists in adult life.[12] Therefore, it is important for medical students to adopt physical activity which in turn promotes mental health and prevents distress, anxiety and depression. Hence, this study was conducted to assess the level of physical activity and mental health status among undergraduate medical students and to find the association between them.

Method:

Cross-sectional study was conducted among undergraduate medical students for a period of six months from August 2021 to January 2022 in one of the medical college in Karnataka after obtaining approval from the Institutional Ethics Committee.

A convenient sampling was done and a total of 214 medical students from all professional years were considered for the study, of which 145 students accepted to get enrolled in the study on voluntary basis and the remaining 69 students who did not agree to participate in the study were excluded from the study. Data was collected using the proforma after taking a written informed consent from the students.

The questionnaire consisted of two sections - Part I and Part II. Part I consisted of socio-demographic details of the participants such as age, gender, year of study, height, weight, habits. Part II consisted of International Physical Activity Questionnaire - short form (IPAQ-SF) to assess the level of physical activity and General Health Questionnaire-12 (GHQ-12) to assess the mental health status of the students.

IPAQ-SF[13]: It consisted of seven questions with pre-defined options which is widely used to measure the level of physical activity. A minimum time of 10 minutes of physical activity was required to be included in the analysis. The short version of the questionnaire is related to the physical activities at high or moderate level, walking, and time spent sitting. The level of physical activity used in the questionnaire is presented in the corresponding Metabolic Equivalent of Task units (MET) (1 MET=a resting energy expenditure assuming oxygen consumption of 3.5 mL-min/kg). As per the requirements of the questionnaire, the following scores of intensities of physical activity were used in the analysis: walking = 3.3 METs, moderate physical activity = 4.0 METs, and vigorous physical activity = 8.0 METs. Total physical activity level was defined in MET-minutes/week.

Level of physical activity was assessed using the following formula:

Level of physical activity = MET level x minutes of activity/day **x** days per week.

After calculating the level of physical activity, the participants were divided into various categories namely,

Low level: < 600 MET-minutes/week

Moderate level: ≥ 600 to < 3000 MET-minutes/week

High level: ≥3000 MET-minutes/week.

General Health Questionnaire-12 (GHQ-12)[14]: Developed by Goldberg, has been adopted by WHO as a screening tool for psychological disturbances and disorders. Scoring is done on the Likert Scale giving 0, 1, 2, 3 scores. Score 0-14 indicates normal mental health status, 15-20 indicates evidence of distress, whereas score >20 suggests severe problems and psychological distress.

Statistical analysis: Data collected was analysed using SPSS software version 27.0. Descriptive statistics was done and Chi-square (χ^2) test was applied to determine association between two categorical variables. Odds ratio with 95% confidence interval was calculated. Statistical significance was set at 5% ($p<0.05$).

Results:

Total of 145 medical students participated voluntarily in the study. Majority were females 74 (51.03%) and males were 71 (48.97%). Mean age of the study participants was 20.34 ± 2.34 years.

Of the 145 study participants, it was found that 60.00% were doing moderate level of physical activity. 30.98% males were doing high level physical activity as compare to that of 20.27% females who were doing low level of physical activity. When mental health status was assessed, it was found that 49.66% of study participants were having normal mental health status. It was also found that 29.73% and 25.68% of females were distressed and psychologically distressed respectively as compared to males who were less distressed as shown in Table 1.

When the Mental Health Status was compared in relation to the level of Physical Activity it was found that 30.00% and 24.24% study participants who were doing low level of physical activity were distressed and psychologically distressed respectively, whereas 68.05% and 26.39% of the participants who were doing moderate and high levels of physical activities respectively were not having any type of distress. This association was statistically significant (χ^2=10.826, df=4, p=0.028) as mentioned in Table 2.

When the BMI was compared in relation to Mental Health Status, it was found that 36.67% had obesity and 11.11% underweight were suffering from psychological distress as compared to 55.56% underweight and 49.30% having normal BMI were having better mental health status as mentioned in Table 3.

When the BMI was compared in relation to level of Physical Activity it was found that 54.93% had normal BMI and 77.78% were underweight who were doing moderate physical activity. It was also found that 27.27% were obese were performing low level of physical activity as compared to 11.11% underweight were performing high level of physical activity as mentioned in Table 4.

Table 1: Gender-wise distribution of participants in relation to their level of Physical Activity and Mental Health Status(n=145)

Physical Activity MET/Week	**Male**		**Female**		**Total**	
	No.	%	No.	%	No.	%
Low(< 600)	9	12.68	15	20.27	24	16.55
Moderate(≥600 to <3000)	40	56.34	47	63.51	87	60.00
High(≥3000)	22	30.98	12	16.22	34	23.45
Total	71	48.97	74	51.03	145	100.00
Mental Health Status	**Male**		**Female**		**Total**	
	No.	%	No.	%	No.	%
Normal	39	54.93	33	44.59	72	49.66
Distress	18	25.35	22	29.73	40	27.59
Psychological Distress	14	19.72	19	25.68	33	22.75
Total	71	48.97	74	51.03	145	100.00

Table 2: Comparison of Mental Health Status in relation to level of Physical Activity (n=145)

Physical Activity MET/Week	Mental Health Status							
	Normal		Distress		Psychological distress		Total	
	No.	%	No.	%	No.	%	No.	%
Low(< 600)	4	5.56	12	30.00	8	24.24	24	16.55
Moderate (≥ 600 to < 3000)	49	68.05	19	47.50	19	57.58	87	60.00
High(≥ 3000)	19	26.39	9	22.50	6	18.18	34	23.45
Total	72	49.66	40	27.59	33	22.76	145	100.00
Chi square = 10.826, df = 4, p = 0.028 (significant) **Odds Ratio* = 0.1559 (95% CI: 0.0503 to 0.4835)**								

(* Distress and psychological distress are combined and Moderate and high levels of physical activity are combined to calculate odds ratio)

Table 3: Comparison of Body Mass Index in relation to Mental Health Status

Mental Health Status	Body Mass Index (BMI)									
	Normal		Overweight		Obese		Underweight		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Normal	35	49.30	22	48.89	05	45.45	10	55.56	72	49.66
Distress	17	23.94	15	33.33	02	18.18	06	33.33	40	27.59
Psychological Distress	19	26.76	08	17.78	04	36.37	02	11.11	33	22.75
Total	71	48.97	45	31.04	11	07.58	18	12.41	145	100.00
Chi square = 4.5787, df = 6, p = 0.5989 (Not Significant)										

Table 4: Comparison of Body Mass Index in relation to Physical Activity

Physical Activity MET/Week	Body Mass Index (BMI)									
	Normal		Overweight		Obese		Underweight		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Low (< 600)	14	19.72	05	11.11	03	27.27	02	11.11	24	16.55
Moderate (≥ 600 to <3000)	39	54.93	28	62.22	06	54.55	14	77.78	87	60.00
High (≥ 3000)	18	25.35	12	26.67	02	18.18	02	11.11	34	23.45
Total	71	48.97	45	31.04	11	07.58	18	12.41	145	100.00
Chi square = 5.2717, df = 6, p = 0.5095 (Not Significant)										

Discussion:

Medical students always face a unique set of stressors during their medical education training that is associated with increased incidence and prevalence of mental health disorders, such as depression, anxiety, and suicidal ideation.

In this study a total of 145 medical students participated, of which 16.55% were performing low level of physical activity whereas 60.00% and 23.45% were performing moderate and high level of physical activity respectively. This finding is contrary to the findings of study done in one of medical college in Pune, Maharashtra among medical students by Ashok P et al which revealed that 40%, 47% and 13% medical students were performing low, moderate and high levels of physical activity respectively.[15]

Present study found that 20.27% female studentswere physically inactive compared to male students (12.68%). Similar finding was found in studies done among medical students in Davangere, Karnataka by Patil VV et al and in Thrissur, Kerala by Jose J et al which found that female students were physically inactive compared to male students. [12, 16] This can be due to the reason that male students are more engaged in exercises, going to gym and sports on daily basis compared to female students.

The present study revealed that 83.45% medical students were physically active, of which 60% and 23.45% had moderate and high levels of physical activity and 16.55 were physically inactive. The findings are in line with the study done among medical students in Thrissur, Kerala by Joy V et al where the study findings showed that 71.1% were found as physically active and 28.9% as physically inactive. Among the physically active students, 54.44% and 16.66% showed moderate and high levels of physical activity, respectively.[17]

Present study found that 50.34% of medical students were distressed. Similar findings were found in the study done by Khan H et al where 49.10% of students were distressed.[18]

The present study revealed that medical students, who were performing low levels of physical activity were suffering from distress. Similar results were also obtained from the previous study done in Thrissur, Kerala by Jose J et al which found that medical students who were physically inactive suffered from anxiety and depression.[16]

When the BMI was compared in relation to Mental Health Status, it was found that 36.67% had obesity and 11.11% underweight were suffering from psychological distress, this shows that as the BMI increases the level of distress also increases. When the BMI was compared in relation to level of Physical Activity it was found that 54.93% had normal BMI and 77.78% were underweight who were doing moderate physical activity, this shows that optimal level of physical activity plays a major role in maintaining BMI. Irrespective of the mental status of the study participants all of them practiced adequate physical activity, as there were regular yoga sessions for students, sports facility at the institute level and students were consistent in performing physical activity on a daily basis.

Conclusion:

This study concludes that male students were doing high level of physical activity compared to female students. Female participants being physically inactive were distressed compared to male participants who were less distressed. Study found statistically significant association between Mental health status and physical activity as the study participants who were doing low level of physical activity were distressed and psychologically distressed, whereas the students with moderate and high levels of physical activity were not distressed. Hence, Physical activity and mental health are related proportionally. Further research is warranted to develop better understanding of various predictors of physical inactivity and distress. The awareness about mental health and need for physical activity among medical students need to be considered.

Recommendations:

Lack of Physical activity will lead to negative impact on the mental status of the medical students, which increases as they enter higher level of academics, indirectly affecting their health and leading to early development of non-communicable diseases. Counselling sessions should be conducted to all medical graduates at the entry level, on periodical basis, at the time of completion of the college and should be continued thereafter during their professional life. Counselling regarding coping daily stress with time management for studies and physical activity and also de-stressing sessions like yoga, meditation, cultural and sports activities should be made compulsory from the beginning of the first year as their part of their curriculum, so that they can overcome and face untoward events in their lives for their better future.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References:

1. Physical activity-WHO fact sheet; 2020. Available at: https://www.who.int/news-room/fact-sheets/detail/physical-activity (Accessed on Feb 2nd, 2022)
2. World Health Organization. Global action plan on physical activity 2018-2030: more active people for healthier world. Available at:https://www.who.int/publications/i/item/9789241514187(Accessed on Dec5th, 2022)
3. Launch of new global estimates on levels of physical activity in adults. World Health Organization. Available at https://www.who.int/news/item/05-09-2018-launch-of-new-global-estimates-on-levels-of-physical-activity-in-adults(Accessed on June 9th, 2023).
4. Physical activity in low and middle income countries. Available at (Accessed on June 9th, 2023).
5. Physical activity. National Health Portal. Ministry Of Health and Family Welfare 2018. Available at https://www.nhp.gov.in/healthlyliving/physical-activity(Accessed on Feb 3rd, 2022)
6. Physical activity and non-communicable diseases. Available at: https://www.physio-pedia.com/Physical_Activity_and_Non-Communicable_Diseases(Accessed on June 10th, 2023).
7. Mental Health: Strengthening our response. WHO Fact sheet 2018. Available at https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response (Accessed on Mar10th, 2022)
8. Mental Health. Centres for Disease Control and Prevention. Available at https://www.cdc.gov/mentalhealth/learn/index.htm(Accessed on Mar12th, 2022)
9. Thuma T, Lawandy M, Lotfalla A, et al. Mental Health Matters: Mental Health and Overall Well-Being Among First- and Second-Year Medical Students. Health Professions Education. 2020;6(1):516-21.
10. Malm C, Jakobsson J, Isaksson A. Physical Activity and Sports-Real Health Benefits: A Review with Insight into the Public Health of Sweden. Sports. 2019;7(5):1-28.
11. Schuch F, Vancampfort D, Firth J, et al. Physical activity and sedentary behavior in people with major depressive disorder: A sytematic review and meta-analysis. Journal of Affective Disorders. 2017;210(1):139-50.
12. Patil VV, Basavaraju V. Patterns and Barriers of Physical Activity among Medical Students in Davangere, Karnataka. Natl J Community Med. 2020;11(8):371-5.
13. International Physical Activity Questionnaire-Short form (IPAQ-SF). Available at www.ipaq.ki.se. (Accessed on May 8th, 2021)
14. Qin M, Vlachantoni A, Evandrou M, et al. General Health Questionnaire-12 reliability, factor structure, and external validity among older adults in India. Indian J Psychiatry. 2018;60(1):56-9.

Validation of Targets Related to Maternal and Child Health Services in the Rural Area of the Bhavnagar District, Gujarat: A Cross Sectional Study

Mira M. Parmar[1], Kailesh D. Bhalani[2], Deep P. Shah[3]

[1]Former PG student, [2]Associate professor, [3]Second Year PG Student, Department of Community Medicine, Government Medical College, Bhavnagar, Gujarat.

Correspondence : Dr. Kailesh D. Bhalani, Email: kdbhalani@gmail.com

Abstract:

Introduction: Despite 'Target free approach' being implemented since more than 20 years, the targets related to MCH services are still decided and distributed by top to bottom approach in Gujarat. Irrational distribution of targets may lead to under or over achievement of the targets by SCs and PHCs. **Objective**: To validate the targets related to MCH services in the rural areas of the Bhavnagar district, Gujarat for the year 2019-2020. **Method:** A cross-sectional study was carried out to count the actual number of MCH beneficiaries by visiting each house of the selected villages (One village each from a good performing and a poor performing SCs of two randomly selected PHCs from each block of Bhavnagar district) and interviewing a family member of the household. This numbers from the villages were compared with the targets assigned to the respective villages. **Results:** The actual number of antenatal women was found to be 26.6% lower and 38.8% higher than the assigned targets for early pregnancy registration in the villages of poor and good performing SCs respectively. Similarly the actual number of deliveries was found to be 47.2% lower than the assigned targets for institutional deliveries in poor performing SCs. It was also observed that the actual number of children eligible for full immunization in the respective area was found to be much lower in both the groups of SCs than the assigned targets. **Conclusion:** Assigned MCH targets were found improper in the villages of Bhavnagar district.

Keywords: Full immunization, Institutional delivery, Registration of pregnancy, Targets.

Introduction:

In India, Family Planning Programme was the first health programme to be introduced in 1952. In fact India was the first country to launch a national programme for Family Planning. Later on the programme was expanded to include the elements of Child Survival and Safe Motherhood (CSSM), Universal Immunization and Reproductive and Child Health (RCH) to focus on overall health of women and children.[1]

Before 1996, there was rigid implementation of target-based approach in the programme. The annual targets were prescribed by the central government to each state, which in turn were passed to the facility level through the system.[2] This approach placed little importance on needs of the community.

In 1995, Ministry of Health and Family Welfare (MoHFW) decided to implement a 'target free approach' (TFA) to family planning in one or two districts of each state in the country on an experimental basis. Later the approach was renamed as Community Needs Assessment Approach (CNAA). The 'top-down' approach was replaced by 'bottom-up' approach with an aim to focus on community needs and to improve the quality of service.[3]

In Gujarat, the approach was piloted in Valsad district. However according to Sangwan and Maru

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Parmar M, Bhalani K, Shah D. Validation of Targets Related to Maternal and Child Health Services in the Rural Area of the Bhavnagar District, Gujarat: A Cross Sectional Study. Healthline. 2023; 14 (3): 225-229
	DOI : 10.51957/Healthline_ 528_2023	

(1999), the approach was not implemented in the field; surveys were conducted to assess the community needs but targets were not assigned as per CNAA.[4]

It has been more than 20 years after implementation of TFA or CNAA, still the targets related to MCH services are decided at state level and then they are distributed to the districts considering the population according to census 2011 and the growth rate of the district. These targets are further distributed to the PHCs and the Sub-centers (SCs) of the district in the same manner.

In 2019-20, according to TeCHO+, Bhavnagar district achieved 31089 ANC registrations as against the target of 41250; 29645 deliveries as against the target of 37510 and 27306 full immunizations against the target of 36600. (SOURCE: Jilla Panchayat, Bhavnagar). It can be seen that overall the targets were under achieved.

However, within the district there were villages which could achieve the targets easily and some of them could even achieve the numbers much higher than the assigned targets. This may be because of irrational distribution of targets.

This study was therefore conducted to validate the assigned targets related to MCH services in the Bhavnagar district by field verification.

Method :

It was a cross-sectional observational study carried out in the rural areas of Bhavnagar district during January to July 2021.

The approval for the study was obtained from the Ethics committee of the Government Medical College Bhavnagar, Gujarat. Multi-stage cluster sampling technique was used to select the villages for the study.

There are a total of 48 PHCs (Primary Health Centers) located across the 10 blocks of Bhavnagar district. In first stage, two PHCs were selected from each block, using lottery method. In second stage, one good performing (best) and one poor performing (worst)sub-centers were selected from each of the selected PHCs, based on their target achievement for ANC registration for the year 2019-20. In third stage, from each of the selected sub-centers, one village was selected by simple random sampling using lottery method.

From the selected villages, all households were visited by the investigator. From each household, a woman, who was pregnant anytime during April 2019 to March 2020, was interviewed. If such woman was not available in the house, any other available adult female member of the household was interviewed. If no female member was available at the time of the visit, then any available adult male member of the household was interviewed.

During the house-to-house survey, 99 houses were found closed and all possible information about those families was collected from their neighbours. Best possible attempts have been made to collect the complete information from available records and from the family member who was best aware about the information.

Demographic information regarding all family members of the household was collected by using pre-tested, semi-structured questionnaire. Data related to assigned targets were provided by the Jilla Panchayat, Bhavnagar. These data were compared with the primary data collected by the investigator.

Informed written consent was obtained from the participants after explaining the nature and purpose of the study in the vernacular language.

Data entry was done in Microsoft excel and data analysis was done in Epi Info software version 7.0 developed by Centers for Disease Control and Prevention (CDC) with appropriate data checks in order to avoid errors in data entry.

Results:

The data was collected from a total of 40 villages (20 good performing and 20 poor performing), comprising a total of 4614 households which included 2413 households from villages of poor performing and 2201 households from villages of good performing subcentres. From each household, one adult member fulfilling the inclusion criteria was interviewed. There were 213 and 331 couples (respectively in the villages of poor and good performing subcentres) with a pregnant woman during the period between April 2019 and March 2020.

Table 1 to 3 show the comparison of assigned targets with the actual number of beneficiaries in the area. The information about assigned targets for different MCH services for the year 2019-20 were collected from JillaPanchayat Bhavnagar and Information about number of pregnant women, number of deliveries and number of children eligible for full immunization in the household during the year 2019-20 was collected from the family member/neighbour of each household.

According to table 2, in poor performing SCs, assigned targets for the institutional delivery were higher by 47.2% than the actual no. of deliveries for that area as verified by field survey. While it was found higher by 2.2% in the villages of good performing SCs. Overall assigned targets for whole area under the study was higher by 26.9% than the actual number of pregnancies in the whole area.

Table 3 shows that, in poor performing SCs, assigned targets for the full immunization were higher by 44.4% than the actual number of eligible children for full immunization in that area as verified by field survey. Similarly the assigned targets were found 28.8% higher in good performing SCs. Overall assigned targets of the whole area under study was higher by 37.1% than the actual number of eligible children for full immunization in the area during the study period.

Table 1: Comparison of the targets for early registration of pregnancy with the actual number of pregnant women in the area during the year 2019-20

Sub-centers	Assigned target for pregnancy registration (a)	Number of pregnant women in the Area (b)	Difference (%=[a-b]/a*100)
Poor performing	293	215	+78 (+26.6%)
Good performing	243	337	-94 (-38.7%)
Total	536	552	-16 (-2.9%)

As observed from Table 1, for poor performing SCs, assigned targets for the year 2019-20 for pregnancy registration were found higher by 26.6% than the actual number of pregnancies during the year in the area as verified by field survey. However, the assigned targets were found lower by 38.7% in the good performing SCs. Overall assigned target of the whole area under study seems to be lower by 2.9%.

Table 2: Comparison of the targets for institutional delivery with the actual number of delivery in the area during the year 2019-20

Sub-centers	Assigned target for institutional delivery(a)	Actual number of deliveries in the area (b)	Difference (%=[a-b]/a*100)
Poor performing	267	141	+126 (+47.2%)
Good performing	219	214	+5 (+2.2%)
Total	486	355	+131 (+26.9%)

Table 3 : Comparison of the targets for Full Immunization with the actual number of Children eligible for Full Immunization in the area during the year 2019-20

Sub-centers	Assigned target for full immunization(a)	No. of eligible children for full immunization (b)	Difference (%=[a-b]/a*100)
Poor performing	259	144	+115 (+44.4%)
Good performing	226	161	+65 (+28.8%)
Total	485	305	+180 (+37.1%)

Discussion:

In this study, the actual number of pregnant women in villages of poor performing SCs was found lower than the assigned target for early registration of pregnancy, while reverse scenario was observed in the villages of good performing SCs. Thus even if all available pregnant women in villages of poor performing SCs would have had their pregnancies registered, it would not have been possible for SCs to achieve the assigned targets. On the other side, for villages in good performing SCs, even if only 72% of all the pregnancies could be registered, targets of these villages could be achieved. This irrational assignment of the targets results into wrong assessment of the performance of the SCs, which ultimately makes the whole exercise of assessing the performance of the SCs useless.

For institutional delivery, the assigned targets were found nearly twice the actual number of deliveries that took place in the villages of poor performing SCs during the same year. Therefore even if all the pregnant women of the area had delivered their babies in an institution, the SCs would achieve only about 50% of the assigned targets. However for good performing SCs, the assigned targets for the institutional delivery were found nearly comparable to the actual number of deliveries that took place in the area. And probably that might be the reason of them being identified as good performing SCs.

It was observed that for full immunization, the actual number of eligible children in the villages of poor and good performing SCs was respectively 44.4% and 28.8% less as compared to the assigned targets for the same year. Thus it was not possible for SCs to achieve the assigned targets even with the best of their efforts.

This so-called (false)under-achievement or poor performance leads to undue pressure from higher authorities on the staff and this in turn may lead to false(exaggerated) reporting of MCH services by field staff. This may lead to generation of wrong and useless reports which cannot be used for monitoring or policy decisions at higher level. This practice of exaggerated reporting leads to perception among higher authorities that the assigned targets are appropriate. So they give similar targets for the next year and this cycle continues. This practice results into wastage of human resources in useless work.

Conclusion:

Over all it was observed that, MCH targets set by higher authorities were found notably different from the number of available beneficiaries during the same year in the same rural area of the Bhavnagar district.

Recommendations

The distribution of MCH targets (ANC, registration, Institutional delivery and full Immunization) needs to be rationalized. If this can be done, official record of the performance of Bhavnagar

district (as a whole) will be improved significantly. And it may also improve the record of the performance of the so-called poorly performing SCs. This may provide us the real data about the performance of the centers, which can be used by the authorities for various purposes. The targets for the area should be determined on the basis of latest available records like Family Health Survey or any other latest and reliably updated records.

Declaration:

Conflict of Interest: Nil

Funding: Nil

References:

1. Visaria L, Jejeebhoy S, Merrick T. From Family Planning to Reproductive Health: Challenges Facing India. Int Fam Plan Perspect 1999;25:S44.
2. Policy Project II, The Futures Group International. Review of Implementation of Community Needs Assessment approach for Family Welfare in India.
3. Ministry of Health and Family Welfare. Manual on Community Needs Assesment Approach. 1998;
4. Sangwan N, Maru RM. The Target-Free Approach: An Overview. J Health Manag 1999;1(1):71–96.

Risk Factors and Protective Factors for COVID-19 Infection among Patients Visiting University Health Centre of Vadodara District: A Case Control study

Reetika Ranjan[1], Sangita V Patel[2], Sonal Mishra[3]

[1]Senior Resident, [2]Associate Professor, Department of Community Medicine, Medical College, Baroda, Gujarat

[3]Consultant Physician & Chest Medical Officer, University Health Center, Maharaja Sayajirao University of Baroda, Gujarat.

Correspondence : Dr. Sangita Patel, Email : sangita_psm@yahoo.co.in

Abstract:

Introduction: Identification of risk factors and protective factors of COVID-19 can help in controlling the disease in healthcare and the community. **Objective:** To determine the risk factors and protective factors of COVID-19 among patients visiting University Health Centre of Vadodara district. **Method:** A case control study was done at University Health Centre of the district. Hundred cases who were COVID-19 positive by RTPCR/RAT testing and 100 controls who were RTPCR/RAT negative and never displayed its signs and symptoms were asked about knowledge of parameters such as hand hygiene, social distancing, any ayurvedic or homeopathic medicine intake, chemoprophylaxis of HCQ, visit to public places, any travel history outside city, state or country, the manner, place, and type of masks used by them to know the risk and protective factors for COVID-19. **Results:** Significant risk factors for COVID-19 infection based on logistic regression were increasing age (OR=3.65, p=0.004), higher education (OR=4.72, p=0.001), self-medication of homeopathic or ayurvedic medicines (OR=6.27, p=0.005). Significant protective factors for COVID-19 infection based on logistic regression were regular use of mask (OR=0.03, p=<0.0001), correct technique of mask use (OR=0.17, p=0.02), and maintaining social distance (OR=0.18, p=0.049). **Conclusion:** This study revealed the factors associated with occurrence of COVID-19 were increasing age, higher education, self-medication and factors which protect from infection were regular use of mask, correct technique of mask use, and maintaining social distance.

Keywords: Case control Study, COVID-19, Protective factors, Risk factors

Introduction:

A new coronavirus called SARS-CoV-2 is responsible for COVID-19 disease. WHO first learned on 31 December 2019 about this virus.[1] Based on available evidences, the COVID-19 virus is transmitted through direct means (droplet and person-to-person transmission) as well as by indirect contact (contaminated objects and airborne contagion).[2] Preventive and diminution measures are key in both healthcare and community environment. The most effective preventive measures in the community include: frequently performing hand hygiene with an alcohol-based hand rub if your hands are not visibly dirty or when hands seem dirty washing with soap and water; Avoiding touching your eyes, nose and mouth; wearing a medical mask if you have respiratory symptoms and performing hand hygiene after disposing of the mask; maintaining social distance (a minimum of 1 meter) from individuals with respiratory symptoms.[1] Evidence was available

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Ranjan R, Patel S, Mishra S. Risk Factors and Protective Factors for COVID-19 Infection among Patients Visiting University Health Centre of Vadodara District: A Case Control study. Healthline. 2023; 14 (3): 230-237
	DOI : 10.51957/Healthline_ 511_2023	

according to which male gender, increased age, underlying disease conditions increase the risk of COVID-19 disease.[3] A Case Control study conducted by J. Kishore found that cases suffering from Diabetes Mellitus (DM) and Hypertension had higher odds of getting COVID as compared to controls. Similar finding were observed by Zhou F in China.[4] So this case control study was conducted to know the risk factors and protective factors for COVID-19.[5]

On analysing various underlying medical conditions amongst controls and cases, it was found that there was a significant difference among cases and controls who had Diabetes Mellitus (DM) and Hypertension (p-value: 0.001) with a high odds ratio of 6.130 and 5.964 respectively.

Objective:

To determine the risk factors and protective factors for COVID-19 among patients visiting University Health Centre of Vadodara district.

Method:

A case control study was carried out at University Health Centre of the district. The study was conducted among residents of university campus including staff members and students studying and residing at university. Those who were COVID-19 positive and minimum 30 days have elapsed from the date of RTPCR/RAT testing were selected as cases. Those who were COVID-19 test negative or those who had never tested for COVID-19 and never developed any Covid related symptoms were selected as controls.

Each participant was explained the purpose of the study and only those who signed the consent form were included in the study. Blood sample for IgG antibody titre was collected by a trained laboratory technician. The blood sample was collected solely for the purpose of measurement of IgG antibody of COVID-19. Report of each participant was given and explained to them. After doing the antibody titer, we removed the participants from the controls who positively showed antibody titer as a result of asymptomatic infection.

Out of 200 participants, 100 were cases and 100 were controls. Pilot study was done among 15 cases and 15 controls to generate the data for calculation of sample size. In this pilot study, the Odds of having antibody in COVID-19 positive patients were 3 times higher as compared to non-COVID-19 patients. At 95% CI with power-90%, ratio of cases and controls was 1:1, proportion of exposure in control-20% and in case-42% and using Open Epi software the sample size came 100 in each group. [6] Thus sample size of 100 cases and 100 controls was considered.

A pre-tested, semi-structured questionnaire was used by investigators to conduct the interviews to collect data on COVID-19 disease regarding socio demographic details of the participants, co-morbidity of the patients, knowledge of hand hygiene, social distancing, any ayurvedic medicine or homeopathic medicine intake, chemoprophylaxis of HCQ, visit to public places like hotels, malls, parks, participation in social gatherings like party, marriage, any travel history outside city, state or country, the manner, place, and type of masks used by them.

Data entry was done in Microsoft Excel 2007 and analyzed by using MedCalc software version 12.5.0.0.[7] Descriptive analysis was used to describe the distribution of all variables in cases and control group. Chi-square test was applied to determine the association between exposure and outcome. Factors which were found statistically significant were considered for logistic regression analysis.

The study was approved from the Institutional Ethical Committee for Biomedical and Health Research (IECBHR) of the institute. After explaining the participants in their local language about the study, its purpose and confidentiality of information a written consent was taken from them before starting interview.

Results:

Hundred cases and hundred controls (mean age and SD of cases-42.97±15.91 years, controls-

Table 1: Factors Associated with Coronavirus Disease among Cases And Controls (Cases 100, Controls 100)

Parameters	Cases n=100(%)	Controls n=100(%)	Crude OR	95%CI	χ2	pvalue
Age(in years)						
>45	49(49%)	28(28%)	2.47	1.37-4.44	9.31	**0.0025**
≤45	51(51%)	72(72%)				
Gender						
Male	46(46%)	43(43%)	1.12	0.64-1.97	0.06	0.806
Female	54(54%)	57(57%)				
Education						
More than or equal to graduation	68(68%)	44(44%)	2.70	1.51-4.81	11.68	**0.0007**
Less than graduation	32(32%)	56(56%)				
Travel History						
Yes	39(39%)	40(40%)	0.959	0.54-1.69	0.020	0.885
No	61(61%)	60(60%)				
Visit outside the home						
Never	31(31%)	79(79%)	0.591	0.31-1.12	2.59	0.108
Twice weekly/ Daily	69(69%)	21(21%)				
Social gathering						
Yes	30(30%)	79(79%)	1.049	0.57-1.92	0.024	0.876
No	70(70%)	21(21%)				
Mask use						
Regular	48(48%)	86(86%)	0.150	0.07-0.29	32.64	**<0.0001**
Irregular	52(52%)	14(14%)				
Technique of wearing mask						
Correct	80(80%)	90(90%)	0.44	0.19-1.0	3.921	0.051
Incorrect	20(20%)	10(10%)				
Knowledge of hand hygiene						
Yes	85(85%)	77(77%)	1.69	0.82-3.47	2.07	0.149
No	15(15%)	23(23%)				
Maintaining social distance						
Yes	83(83%)	90(90%)	0.54	0.23-1.25	2.098	0.1478
No	17(17%)	10(10%)				
Self-medication of Homeopathic/ Ayurvedic medicine						
Yes	21(21%)	7(7%)	3.531	1.42-8.74	8.13	**0.004**
No	79(79%)	93(93%)				
Home remedies						
Yes	30(30%)	22(22%)	1.519	0.80-2.87	1.663	0.197
No	70(70%)	78(78%)				
HCQ prophylaxis						
Yes	8(8%)	5(5%)	1.65	0.52-5.23	0.404	0.389
No	92(92%)	95(95%)				
Comorbid conditions						
Present	34(34%)	23(23%)	1.72	0.92-3.21	2.454	0.117
Absent	66(66%)	77(77%)				

Table 2: Regression Analysis of Factors Associated With COVID-19 (Cases 100, Controls 100)

Variables	Coefficient	Std. error	Crude OR	Adjusted OR	95% CI		p-value
					Lower	Upper	
Age>45 years	0.807	0.388	2.47	2.24	1.047	4.799	0.0375
Age ≤45 years	Reference						
Mask use- regular	-1.67	0.430	0.15	0.187	0.080	0.435	0.0001
Mask use- irregular	Reference						
Taking homeopathic/ Ayurvedic medicine	1.337	0.571	3.53	3.81	1.24	11.69	0.019
Not taking Homeopathic/ Ayurvedic medicine	Reference						
Antibody present	1.864	0.408	8.09	6.45	2.90	14.366	<0.0001
Antibody absent	Reference						
Education- more than equal to graduation	1.716	0.409	2.70	5.56	2.49	12.40	<0.0001
Less than graduation	Reference						

37.53±14.52 years) were included. Among cases 46% were males and among controls 43% were males. The education level of cases was more than or equal to graduate in 68% cases while it was 44% among controls.

From the Table 1, there was statistically significant difference with p value <0.05 observed in age (OR-2.47), education (OR-2.70), mask use regularity (OR-0.150), and, self-medication of homeopathic/ayurvedic medicine (OR-3.53) between cases and control.On applying logistic regression as shown in Table 2, the association of COVID-19 disease with age factor was statistically significant. The adjusted odds ratio was 2.24 (95% CI 1.04-4.79, p-value=0.0375) which showed that the odds of having older age group that is >45 years of age among COVID-19 patients was 2 times higher than among those who fall under the age group of ≤45 years.

In case of mask use regularity, adjusted odds ratio was found to be 0.187 (95% CI 0.080-0.435, p-value=0.0001) which showed that the risk of having COVID-19 disease is 0.187 times lower in those group that wore mask regularly as compared to the group that did not wear mask regularly, this association was statistically significant. In other words, the probability of developing COVID-19 was 81% (1-0.187) lesser in those participants who wore mask regularly as compared to the control group.

Regarding participant's taking homeopathic or ayurvedic medicines it was found that the adjusted odds ratio was 3.81 (95% CI 1.24-11.69, p-value=0.019) which showed that the odds of taking homeopathic/ayurvedic medicine among cases was 3.81 times higher than among controls, this association was statistically significant.

With respect to the presence of antibodies, the adjusted odds ratio was 6.45 (95% CI 2.90-14.36, p-value=<0.0001) which showed that the formation of antibody in cases was 6.45 times higher as compared to the control, this association was statistically significant.

Regarding education, adjusted odds ratio was 5.56 (95% CI 2.49-12.40, p-value=0.019) which showed that the odds of having higher education up to graduation or post-graduation among COVID-19 patients was 5.56 times higher than among those who were educated up to school level below graduation, this association was statistically significant. The above analysis was with respect to

Table 3: Factors Associated with Corona virus Disease among Cases and Controls (Cases 100, Controls 64*)

Parameters	Cases n=100(%)	Controls n=64(%)	Crude OR	95%CI	χ2	pvalue
Age(inyears)						
>45	49(49%)	16(25%)	2.88	1.44-5.73	9.395	**0.0026**
≤45	51(51%)	48(75%)				
Gender						
Male	46(46%)	34(53.12%)	0.751	0.40-1.40	0.792	0.373
Female	54(54%)	30(46.88%)				
Education						
More than or equal to graduation	68(68%)	31(48.43%)	1.99	1.04-3.80	4.456	**0.035**
Less than graduation	32(32%)	33(51.56%)				
Travel History						
Yes	39(39%)	32(50%)	0.63	0.33-1.20	1.923	0.16
No	61(61%)	32(50%)				
Visit out side the home						
Never	31(31%)	21(32.81%)	0.91	0.46-1.8	0.059	0.80
Twice weekly/ Daily	69(69%)	43(67.19%)				
Social gathering						
Yes	30(30%)	18(28.13%)	1.09	0.54-2.18	0.066	0.796
No	70(70%)	46(71.87%)				
Mask use						
Regular	48(48%)	61(95.31%)	0.045	0.03-0.15	39.19	**<0.0001**
Irregular	52(52%)	3(4.69%)				
Technique of wearing mask						
Correct	80(80%)	61(95.31%)	0.197	0.05-0.69	7.588	**0.011**
Incorrect	20(20%)	3(4.69%)				
Knowledge of hand hygiene						
Yes	85(85%)	53(82.81%)	1.176	0.50-2.75	0.14	0.708
No	15(15%)	11(17.19%)				
Maintaining social distance						
Yes	83(83%)	61(95.31%)	0.24	0.06-0.85	5.524	**0.027**
No	17(17%)	3(4.69%)				
Self-medication of Homeopathic/Ayurvedic medicine						
Yes	21(21%)	4(6.25%)	3.987	1.30-12.2	6.571	**0.015**
No	79(79%)	60(93.75%)				
Home remedies						
Yes	30(30%)	13(20.31%)	1.681	0.79-3.53	1.893	0.171
No	70(70%)	51(79.69%)				
HCQ as prophylaxis						
Yes	8(8%)	4(6.25%)	1.30	0.37-4.52	0.176	0.675
No	92(92%)	60(93.75%)				
Comorbid condition						
Present	34(34%)	17(26.6%)	1.42	0.71-2.84	1.007	0.316
Absent	66(66%)	47(73.4%)				

*Total 36 controls (Out of 100) had positive antibody titer so they were removed for this analysis

Table 4: Regression Analysis of Factors Associated with COVID-19 (Cases 100, Controls 64*)

Variables	Coefficient	Std. error	Crude OR	Adjusted OR	95% CI		p-value
					Lower	Upper	
Age>45 years	1.29	0.46	2.88	3.65	1.48	8.99	0.004
Age ≤45 years	Reference						
Education- more than equal to graduation	1.55	0.48	1.99	4.72	1.81	12.28	0.001
Less than graduation	Reference						
Mask use-regular	-3.24	0.67	0.04	0.03	0.01	0.14	<0.001
Mask use- irregular	Reference						
Correct technique of mask use	-1.76	0.79	0.19	0.17	0.03	0.81	0.02
Incorrect technique of mask use	Reference						
Maintaining social distance	-1.69	0.86	0.24	0.18	0.03	0.99	0.049
Not maintaining social distance	Reference						
Self-medication of Homeopathic/ Ayurvedic medicine	1.83	0.65	3.98	6.27	1.74	22.51	0.005
Not taking Homeopathic/ Ayurvedic medicine	Reference						

*Total 36 controls (Out of 100) had positive antibody titer so they were removed for this analysis

the total sample size 200, that is 100 cases and controls each. total 36 controls were found to be seropositive for IgGAb titre of COVID-19. Although they were asymptomatic and healthy, at some point of time they were positive for COVID-19. It was decided not to include these 36 seropositive participants for IgGAb titre of COVID-19 among cases because at the time of ethical approval cases were defined as RTPCR/RAT positive. After removing the controls in which antibody titre was found, the sample size for controls became 64 (100-36). Therefore, the analysis shown in the Table 3 was with respect to 100 cases and 64 controls.

As shown in Table 3, there was statistically significant difference observed in age (OR-2.88, 95% CI 1.44-5.73, p-value-0.002), education (OR-1.99, 95% CI- 1.04-3.80, p-value-0.035), mask use regularity (OR-0.045, 95% CI-0.03-0.15, p-value-<0.0001), technique of mask wearing (OR-0.197, 95% CI-0.05-0.69, p-value-0.011), maintaining social distance (OR-0.24, 95% CI-0.06-0.85, p-value-0.027) and, self-medication of homeopathic/ayurvedic medicine (OR-3.98, 95% CI-1.30-12.2, p-value-0.015) between cases and control.

On applying logistic regression as shown in Table 4, the association of COVID-19 disease with age was statistically significant. The adjusted odds ratio was 3.65 (95% CI 1.48-8.99, p-value=0.004) which showed that the odds of having older age group that is >45 years of age among COVID-19 patients was 3.65 times higher than among those who were under the age group of <45 years. Regarding education, adjusted odds ratios was found to be 4.72 (95% CI 1.81-12.28, p-value=0.001) which showed that the odds of having higher education up to graduation or post-graduation among COVID-19 patients was 4.72 times higher than those who were educated up to school level below graduation, this association was statistically significant. In case of mask use regularity, adjusted odds ratio was found to be 0.03 (95% CI 0.01-0.14, p-value=<0.0001) which showed that the probability of developing COVID-19 was 97% (1-0.03) lesser in those participants who wore mask regularly as compared to those participants who did not wear masks regularly, this association was statistically significant.

The association of technique of mask use with COVID-19 was statistically significant. The adjusted

odds ratio was 0.17 (95% CI 0.01-0.14, p-value=<0.0001) which showed that the probability of developing COVID-19 was 83% (1-0.17) lesser in those participants whose technique of wearing mask was correct as compared to participants whose technique at wearing mask was incorrect. This association was statistically significant.

In case of maintaining social distance, adjusted odds ratio was found to be 0.18 (95% CI 0.03-0.81, p-value=0.02) which showed that the risk of having COVID-19 disease was 0.18 times lower in those group who maintained proper social distance compared to the group that did not maintain proper social distance, this association was statistically significant. In other words, the probability of developing COVID-19 was 82% (1-0.18) lesser in those participants who maintained proper social distance among public as compared to participants who did not maintain social distance, this association was statistically significant.

Regarding participant's taking homeopathic or ayurvedic medicines the adjusted odds ratio was 6.27 (95% CI 1.74-22.51, p-value=0.005) which shows that the odds of taking homeopathic/ayurvedic medicine among cases was 6.27 times higher than among controls, this association was statistically significant.

Discussion:

The occurrence of COVID-19 was 3.65 times higher in people with >45 years of age as compared to people with ≤45 years of age. This result was in concordance with a study done by Shahbaziet al who also demonstrated a higher incidence rate between the elderly populations with odds ratio 1.97 and the incidence of COVID-19 in men was 2.19 times higher than women.[3] Elderly people, because they have a less capable immune response to infectious challenges, are more susceptible to infection. In our study, no statistically significant difference was observed among men and women in having COVID-19.

Those who were highly educated were at high risk of getting COVID-19 and this difference was statistically significant. The reason might be going outside home frequently either for job or other purposes. Being highly educated the participants would have been more aware & hence have got themselves tested early. In the present study, no association was found between mass gathering history, travel history and COVID-19. Contradictory to the study, one cross sectional study conducted by Whaley C et al suggested that social gatherings were associated with increased rates of diagnosed COVID-19.[8] Similar findings were observed by cohort study conducted by Al Awaidy in Muscat, Oman.[9]

In this study, compliance to mask use and technique of its use was strongly associated with lower risk of COVID-19. The probability of developing COVID-19 was 97% lesser in those participants who wore mask regularly as compared to the their counterparts who did not wear mask properly. Similar finding was observed in a study by Doung-Ngern P et al [10]But deciding the specific type of mask use by participants was difficult as maximum of them used mix type of mask.

In present study, knowledge of hand hygiene was not statistically significant among cases and controls. But a negative association was found between risk for COVID-19 and maintaining a social distance of ≥2 m. In the study conducted by Doung-Ngern P et al in Thailand, it was found that there was a negative association between risk for SARS-CoV-2 infection and hand washing, maintaining a distance of ≥1 m from a COVID-19 patient thus acting as protective factors against COVID- 19. [10]

According to this research, those who were taking homeopathic or ayurvedic medicines had more chances of acquiring COVID-19 infection. Firstly, It suggests that homeopathic or ayurvedic medicines are not effective in preventing the occurrence of infection. Secondly, using these medicines might have given a false sense of security to the cases which might have led to not following COVID appropriate behavior.

In the present study, the role of HCQ in preventing cases of COVID-19 was not established. Similarly in a study conducted by Rajasingham R et al, it was concluded that pre-exposure prophylaxis with hydroxychloroquine did not significantly reduce COVID-19 illness.[11] Similar findings were concluded in another study conducted by Boulware DR et al. [12]

In the present study, no statistically significant difference was observed in comorbid conditions between cases and control. On the other hand, a study conducted by Shahbaziet al estimated the OR of the incidence of COVID-19 was 2.26 times more in comorbid patients compared to healthy ones.[3] The generalizability of the study is limited because the study was conducted in university health centre at the time of second wave of COVID-19.

Conclusion:

Increasing age, higher education, self-medication of homeopathic/ayurvedic medicine were found to be strongly associated with COVID-19 infection. Whereas, regular use of mask, maintaining proper social distance and correct technique of wearing mask were found to be protective factors against COVID-19.

Recommendations:

People in higher age group (>45 years) were at high risk of getting COVID-19 disease. People should strictly use mask on regular basis, maintain social distance and wear mask properly to avoid COVID-19. Operational research for effective implementation and behaviour change communication to community regarding preventive measures are recommended.

Declaration:

Funding: Source(s) of support in the form of grants, equipment, drugs, or all of these: Maharaja Sayajirao University, Baroda (78,000/-) for ethical clearnce and laboratory tests.

Conflict of Interest: Nil

References:

1. WHO. Question and answers hub [Internet]. [cited 2023 Jul 27]. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub
2. Lotfi M, Hamblin MR, Rezaei N. COVID-19: Transmission, prevention, and potential therapeutic opportunities. Clin Chim Acta [Internet]. 2020 Sep 1 [cited 2023 Jul 30];508:254. Available from: /pmc/articles/PMC7256510/
3. Shahbazi F, Solgi M, Khazaei S. Predisposing risk factors for COVID-19 infection: A case-control study. Casp J Intern Med [Internet]. 2020 [cited 2023 Jul 27];11(Suppl 1):S495–500. Available from: https://pubmed.ncbi.nlm.nih.gov/ 33425266/
4. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet (London, England) [Internet]. 2020 Mar 28 [cited 2023 Jul 27];395(10229):1054–62. Available from: https://pubmed.ncbi.nlm.nih.gov/32171076/
5. Bharti A. Risk Factors of COVID-19 among Patients Attending a Tertiary Care Centre in Delhi: A Case Control Study. Epidemiol Int. 2020 Nov 20;05(04):5–11.
6. OpenEpi - Sample Size for Unmatched Case-Control Studies [Internet]. [cited 2022 Jan 14].Available from: https://www.openepi.com/SampleSize/SSCC.htm
7. MedCalc's Free statistical calculators [Internet]. [cited 2022 Jan 14]. Available from: https://www.medcalc.org/calc/
8. Whaley CM, Cantor J, Pera M, Jena AB. Assessing the Association Between Social Gatherings and COVID-19 Risk Using Birthdays. JAMA Intern Med [Internet]. 2021 Aug 1 [cited 2023 Jul 27];181(8):1090–9. Available from: https://pubmed.ncbi.nlm.nih.gov/34152363/
9. Al Awaidy ST, Khamis F, Mahomed O, Wesonga R, Al Shuabi M, Al Shabibi NS, et al. Epidemiological Risk Factors for Acquiring Severe COVID-19: Prospective Cohort Study. Oman Med J [Internet]. 2021 Sep 1 [cited 2023 Jul 27];36(5):e301. Available from: /pmc/articles/PMC8503749/
10. Doung-Ngern P, Suphanchaimat R, Panjangampatthana A, Janekrongtham C, Ruampoom D, Daochaeng N, et al. Case-Control Study of Use of Personal Protective Measures and Risk for SARS-CoV 2 Infection, Thailand. Emerg Infect Dis [Internet]. 2020 Nov 1 [cited 2023 Jul 27];26(11):2607. Available from: /pmc/articles/PMC7588529/
11. Rajasingham R, Bangdiwala AS, Nicol MR, Skipper CP, Pastick KA, Axelrod ML, et al. Hydroxychloroquine as Pre-exposure Prophylaxis for Coronavirus Disease 2019 (COVID-19) in Healthcare Workers: A Randomized Trial. Clin Infect Dis [Internet]. 2021 Jun 1 [cited 2023 Jul 27];72(11):E835–43. Available from: https://pubmed.ncbi.nlm.nih.gov/33068425/
12. Boulware DR, Pullen MF, Bangdiwala AS, Pastick KA, Lofgren SM, Okafor EC, et al. A Randomized Trial of Hydroxychloroquine as Postexposure Prophylaxis for COVID-19. N Engl J Med [Internet]. 2020 Aug 6 [cited 2023 Jul 27];383(6):517–25. Available from: https://pubmed.ncbi.nlm.nih.gov/32492293/

Online Mindfulness to Deal with Stress during COVID-19 pandemic: A Mixed Method Study in Indian College Students from Kolkata, West Bengal

Anirban Pal[1], Purnava Mukhopadhyay[2], Nidhi Dawar Pal[3], Paramita Datta[4]

[1]Assistant Professor, Department of Anaesthesia, KPC Medical College, Kolkata, West Bengal, India, [2]Medical Superintendent, Department of Public Health, Kalyani ESI Hospital, Kalyani, West Bengal, India, [3]Consultant Microbiologist, Neotia Bhagirathi Woman and Child care Center, Kolkata, West Bengal, India, [4]Associate Professor, Department of Psychology, Salesian College, Siliguri, West Bengal, India

Correspondence : Dr. Anirban Pal, Email: pal.anirban1@gmail.com

Abstract:

Introduction: The COVID-19 pandemic was aggravating the mental stress of vulnerable Indian college students. This mixed-method study aims to explore Mindfulness as a stress - relief tool. **Method:** One hundred and fifty students were randomized to attend online Mindfulness-based intervention (Group M) or usual-care sessions (Group U). Quantitative data in form of perceived stress scores (PSS-10) and qualitative data to understand the student's perspective for stress relief were collected. The quantitative data was subjected to statistical analysis, while thematic analysis was used for the qualitative data. **Results:** The post-program PSS-10 improved ($p<0.0001$) compared to pre-program scores in group M and post program PSS-10 of group M improved ($p<0.0001$)when compared to group U. The qualitative data brought forward four emergent themes of the student's coping strategies of stress relief. **Conclusion:** In this current study, the online Mindfulness program had a positive impact on the perceived stress of Indian college students. Further studies will be required to substantiate the results.

Keywords : Mental health, Stress, College students, COVID-19 pandemic, India

Introduction:

The COVID-19 pandemic has psychologically affected two-thirds of Indian undergraduate college students[1] and 86 % suffered from moderate stress.[2] The student population was vulnerable to stress, the pandemic only added to their burden. Addressing the negative effect of COVID-19 on the student population (emerging adults) should be a priority.[3] Research in western countries found college students to benefit from Mindfulness[4] and National Health Service (NHS, England) recommends Mindfulness for their stress relief.[5] But quality research with Mindfulness in Indian college students remains limited even after extensive Pubmed and other database search.

Mindfulness is defined as "paying attention in a particular way on purpose, in the present moment, and non judgmentally."[6] The conventional Mindfulness based stress reduction (MBSR) programs are modifiable to online Mindfulness based interventions (MBIs) which are equally effective.[7] This study aims to see the effects of a brief online Mindfulness intervention on perceived stress score (PSS-10) in Indian college students during pandemic times. A qualitative part added to deepen the understanding of mechanism of stress-relief. Authors formulate a hypothesis that Mindfulness will effectively lower the stress.

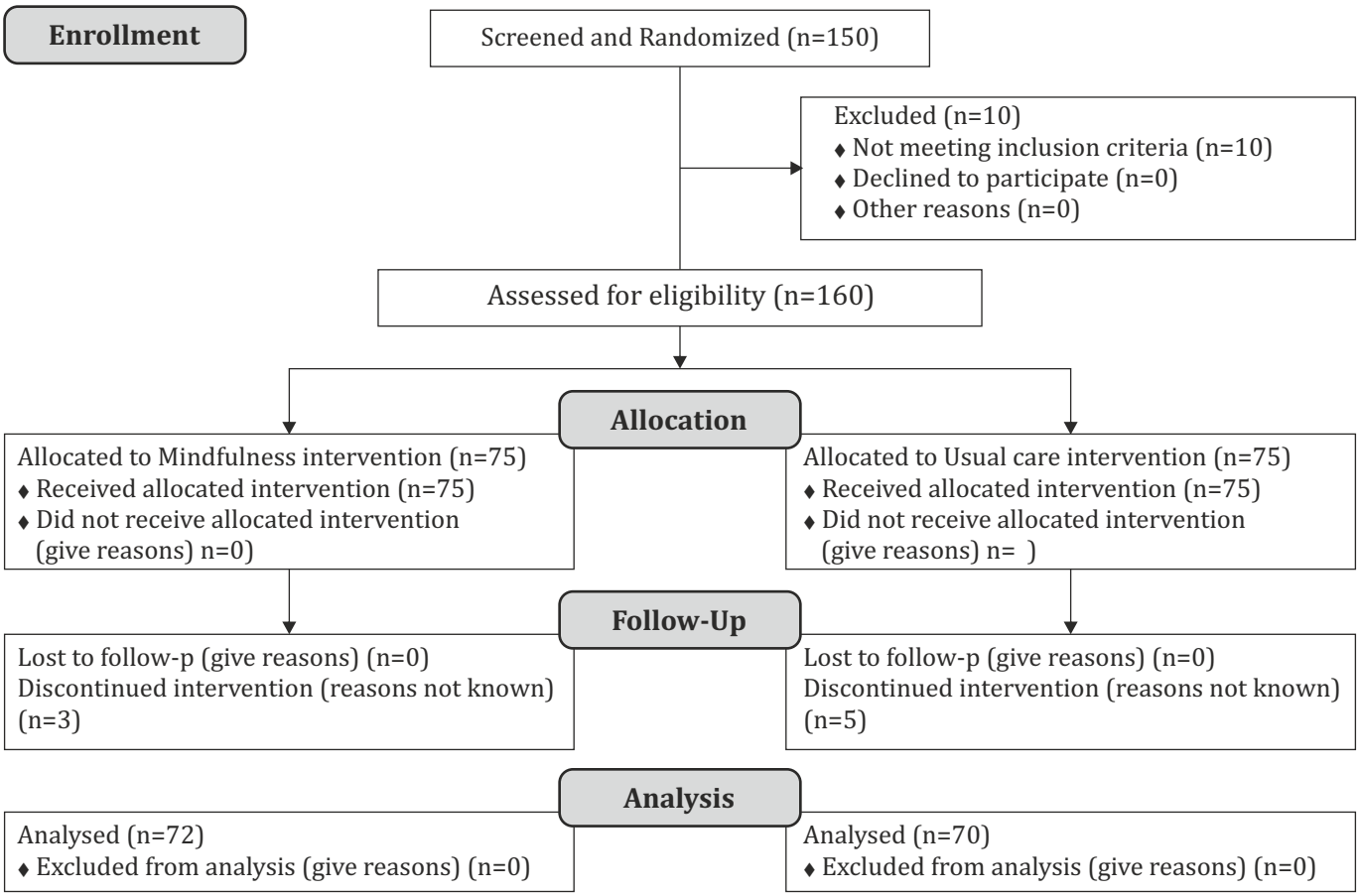
Method:

Study settings and design

The prospective study was conducted, using mixed method (both quantitative and qualitative) approach, during February to August 2022. A medical

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Pal A, Mukhopadhyay P, Pal N, Datta P. Online Mindfulness to Deal with Stress during COVID-19 pandemic: A Mixed Method Study in Indian College Students from Kolkata, West Bengal. Healthline. 2023; 14 (3): 238-243
	DOI : 10.51957/Healthline_ 531_2023	

Figure 1 : Consort 2010 Flow Diagram



institution (in West Bengal, India) collaborated with a Mindfulness center and an undergraduate college to conduct this study. An institutional ethical clearance was obtained, and the study was registered in clinical trial registry of India.

Sample size calculation and randomization

The sample size was calculated based on the assumption of a standard deviation (SD) of 4.10 and 5.77 of the expected difference of mean PSS from the previous non-Indian studies (Huberty J et al and Greeson JM et al) [8-9], with a power of >80% to detect this difference using Paired-t test and Unpaired-t test, with type I error (α) of < 5%. The calculated minimum sample size came out as 64 in each group. Hence the study was started with 150 students (with attrition of 10%) . Randomization was done manually using Random Number Tables of By Rand Corporation, USA©1955.[10] For the qualitative part, 22 agreed to be interviewed and 20 (11 female and 9 male) completed the online interviews.

Recruitment

One hundred and fifty students of an undergraduate college (Indian resident with access to electronic device) were screened and informed consent was taken via emails. Any history of diagnosed psychiatric illness/ undergoing psychiatric treatment [anyone with general anxiety disorder (GAD7 score > 10) and patient health questionnaire (PHQ9 score > 20)] or previous experience with Mindfulness were excluded. This study objective was to focus on mild to moderate mental stress (those with significant mental illness were referred to mental health specialists). The recruitment process detailed in the Consort flow diagram. (Figure 1)

Intervention

The online Mindfulness program had the components of the original MBSR program. (Table1)

Table 1: An overview of five sessions Online Mindfulness Program for stress relief in students (Inspired by the NHS approved website-based program)[11]

Program Details		
Mindfulness instructor was trained via the original MBSR program/ NHS accredited programwith experience of more than three years.		
Program: 5 weekly sessions, 1.5 hour durations, daily practice of 20 minutes and with 30-35 students in a group.		
Session Number	**Session Focus**	**In-session Mindfulness practice**
1.	Introduction to Mindfulness: Participants were introduced to the concepts of Mindfulness.	Mindfulness of Breathing
2.	Stress response: Participants were explained about the mechanism and perception of Stress.	Body scan exercise
3.	Application of Mindfulness: Participants were made to understand how mindfulness can be used in daily life activities.	Mindful eating: raisin exercise
4.	Practical application in stressful situations: Participants were made to understand how mindfulness can be used in Stress.	Breathing space
5.	Sum up of learnings	Review of all exercises
The group U participants attended similar sessions by the same instructor and practiced non-specificrelaxation methods/techniques (excluding mindfulness concepts).		

Measurement tools

The basic participant characteristics (age, sex) were noted at the time of recruitment. PSS-10 was noted at two time points: pre and post-program via mails. The investigator collecting the data was unaware of group allocations. Any participant experiencing any adverse effects were requested to report to the instructor.

Quantitative

PSS-10 is a classic instrument used for stress assessment in research studies.[12]

Qualitative

The qualitative data was collected from 20 participants (of group M) by semi-structured in-depth online interviews. An open ended research question was asked: How you have achieved stress relief by using mindfulness? Every participants' responses were recorded. Based on these a thematic analysis was done by the investigators. Two members of the research team (the principal investigator and a co-investigator with extensive experience in qualitative research) were involved in this process.

Data analysis

The quantitative data of PSS were checked for normality, treated as continuous and analysis was performed using Paired and Unpaired t-Test. Baseline characteristics (age, sex) were tested using Unpaired t- test and Chi-square ($\chi 2$) test respectively. The statistical software used was SPSS Statistics for Windows 7® version 18.0.0 (Chicago, IL 60606-

6412) and Graph Pad Prism® In Stat version 5.0. (California 92037-3219) Results were presented as mean (SD) and percentage format. P<0.05 was considered statistically significant.

Results:

Baseline characteristics (age, sex) were similar between the two groups.Mean Perceived Stress Score in both groups is given in Table 2.

Quantitative measures:

PSS Scores:

The post-intervention mean PSS Scores differed significantly between Groups M and U by Unpaired t-test with p<0.0001 and a large Effect size (d=1.3811) , 95%CI of the above difference was from -4.38 to -2.67 (Table 2) and with in the Group M post-intervention values (compared to pre-intervention) by Paired t-test with p<0.0001 and a large Effect size (d=1.3414) , 95%CI of the above difference was from 3.14 to 4.20 (Table 2) . No adverse effect reported by any participant.

Qualitative measures:

The four themes that emerged were (i) prompt recognition of stress (ii) better understanding of the mechanism of stress (iii) ability to look at stress from

Table 2: Quantitative Analysis of Patient characteristics and mean PSS 10

Variab	Groups Studied				Statistical test and p values			
	Group M (N=72)		Group U (N=70)					
Age Mean (SD)	19.13 (0.56)		19.06 (0.51)		Unpaired t-test (Group M vs. Group U) t=0.75, df=140 p= .44 d(95%CI)=0.13 (-0.11 to 0.24)			
Sex Number (%)	Male= 36 (50.00%)	Female= 36 (50.00%)	Male= 38 (54.28%)	Female= 32 (45.72%)	Chi-Square test (Group M vs. Group U) $\chi 2$=0.26, df=1 p= .60			
PSS Mean (SD)	Group M Pre-test	Group M Post-test	Group U Pre-test	Group U Post-test	Unpaired t-test Group M (Pre-test) vs. Group U (Pre-test)	Unpaired t-test Group M (Post-test) vs. Group U (Post-test)	Paired t-test Group M (Pre-test) vs. Group M (Post-test)	Paired t-test Group U (Pre-test) vs. Group U (Post-test)
	21.26 (2.48)	17.60 (2.97)	21.30 (2.47)	21.13 (2.06)	t=0.08, df=140 p= .93 d(95%CI)= 0.01 (-0.86 to 0.78)	t=8.20, df=140 p<0.0001 d(95%CI)= 1.38 (-4.38 to -2.67)	t=13.77, df=71 p<0.0001 d(95%CI)= 1.34 (3.14 to 4.20)	t=1.68, df=69 p= .09 d(95%CI)= 0.07 (-0.03 to 0.37)

M=Mindfulness Group, U=Usual Care Group, SD= Standard Deviation, PSS=Perceived Stress Score, df=degree of freedom, p=p-value of the test (p<0.05 is statistically significant), d=Cohen's d (Effect Size), CI= Confidence interval.

a different perspective (iv) changing the personal way to respond to stress.

Theme one: Prompt recognition of stress

One participant said, "the mindfulness habit is helping to identify the stressors quickly" (S3, female). Another reported "I am improving every day in watching my mind. The factors causing stress are an easy pick now" (S1, male). Yet another said "Mindfulness training is helping me to recognize stressful situations fast before it overwhelms me" (S11, female). A student added, "Now I can sense stress starting to set in even before the physical sensations of stress develop within me" (S18, female). Another concluded "I am able to detect the chain of negative thoughts building up in my mind leading to an overwhelming response" (S20, male) . One further added "I am now clear that I was getting hooked in to the uncertainty of COVID-19 and getting stressed." (S2, female)

Theme two: Better understanding of the mechanism of stress

The understanding was reflected in a participant's words "my percepttion of the fight or flight response is perhaps the game changer for me" (S10, female) . Another participant said, "as I am training myself to be calm in a stressful situation, it is giving me a lot of confidence to handle such situations better." (S2, female) One student said, "not allowing my stress related thoughts to build up inside me as I well understand the mechanism now" (S17, male) Another added "I can differentiate the reality from thoughts clouding my mind, and am trying to be in the present moment" (S18, female)

Theme three: Ability to look at stress from a different perspective

A change in perspective was pointed out by one participant "I can now clearly understand that I was over-reacting in most situations." (S2, female) Another added, "Instead of getting into a panic I have started seeing the situation as an observer" (S1, male). A student said, "my acceptance of stress response is allowing me to make a choice." (S11, female). Another commented "I can now well appreciate stories popping out in my mind in different situations though still I cannot work with them or stop them." (S3, female) A student felt "I am trying to remain non-judgemental even in situations of stress." (S17, male). Another participant said, "I now understand the difference between reaction and response to a stressful situation." (S10, female)

Theme four: Changing the personal way to respond to stress

The response to stress changes as one participant said, "Now I have a choice to react or not react to a stressful situation." (S8, male) Another participant felt "I have started introspecting whether a stressful condition deserves my reaction." (S2, female) Another said, "I feel I am able to let-go negative thoughts better during stress." (S3, female) A student added, "I can now avoid the panic attacks which I used to have in stressful conditions" (S17, male). Another participant said, "Now whenever I feel stressed I am trying to bring my awareness to mindful breathing and it is really helping me" (S1, male). Another added "I am not allowing the stressful thoughts to build up, I am only observing them without getting involved and allowing them to pass." (S20, male) Aadded "I have developed my own internal mechanism to deal with the stress" (S8, male) Another felt "I am not blindly reacting to stressful situations but trying to be in the present moment and respond" (S11, female) .An additional comment "I have started finding inner calm and peace even in stressful situations." (S5, male)

Discussion:

The results of the study proved the hypothesis. The post program PSS-10 of group M when compared to group U showed statistically significant ($p<0.0001$) improvement. The qualitative data brought forward four main themes: participants learned new ways of coping with the stress.

Previous studies found Mindfulness to decrease stress in US college students.[4,13] Present study results are in-line with previous studies. In Indian context, a preliminary study by the present group of researchers, found online mindfulness to have a potential for stress relief in general population.[14] But the student population are more vulnerable to stress, their challenges more diverse and resources meagre. The strengths of this study are the randomized controlled design, additional qualitative data, and a

considerable sample size. So in the Indian perspective, this study is an important step forward for students (emerging adults) .

Conclusion:

The effects of online Mindfulness to lower stress in Indian students were encouraging during the COVID 19 pandemic. The qualitative part helps in understanding the students' perspective of coping with stress. Further large-scale studies will be required to integrate Mindfulness practices into student mental healthcare strategies.

Limitations:

The outcome variable was self-reported, the participants were from a single institution, only a single instrument (PSS-10) was used, with no scope of follow-up measurements, remain the limitations of the study.

Acknowledgement: Authors thankful to Dr. Indranil Saha of ICMR Kolkata for final checking and valuable suggestions regarding the manuscript.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References:

Healthline Journal Volume 14 Issue 3 (July-September 2023)

Pal et al Mindfulness For Stress Reliefin College Students...

1. Jain T, Ranjan R, Chaudhary N, Kumar P, Ahmad S. Effect on Mental Health among Undergraduate College Students of India during the COVID-19 Pandemic: A Cross-Sectional Multicentric Study. PsychiatrDanub. 2021;33:392-398.
2. Khadirnavar A A, Vanageri H, Asagi R E. Perceived stress, wellbeing and mental health of college student during COVID-19 pandemic. Journal of psychiatric social work 2022;V11:I2:231
3. Saraswathi I, Saikarthik J, Senthil Kumar K, MadhanSrinivasan K, Ardhanaari M, Gunapriya R. Impact of COVID-19 outbreak on the mental health status of undergraduate medical students in a COVID-19 treating medical college: a prospective longitudinal study. Peer J. 2020;8:e10164.
4. Mirabito G, Verhaeghen P. Remote delivery of a Koru Mindfulness intervention for college students during the COVID-19 pandemic. J Am Coll Health. 2022;1-8.
5. Depression in adults: recognition and management. 2009. National Institute for Health and Care Excellence (NICE) . Guideline CG91.https://www.nice.org.uk/guidance/cg91Last accessed 28 Aug 23.
6. Kabat-ZinnJ. Wherever You Go, There You Are: Mindfulness Meditation in Everyday Life. Hyperion; New York: 1994.
7. Bartlett L, Buscot MJ, Bindoff A, Chambers R, HassedC..Mindfulness Is Associated With Lower Stress and Higher Work Engagement in a Large Sample of MOOC Participants. Front. Psychol2021;12:724126.https://doi.org/10.3389/fpsyg.2021.724126Last accessed 28 Aug 23.
8. Huberty J, Green J, Glissmann C, Larkey L, Puzia M, Lee C. Efficacy of the Mindfulness Meditation Mobile App "Calm" to Reduce Stress Among College Students: Randomized Controlled Trial. JMIR MhealthUhealth. 2019;7 (6) :e14273. Published 2019 Jun 25. doi:10.2196/14273.
9. Greeson JM, Chin GR. Mindfulness and physical disease: a concise review. CurrOpin Psychol. 2019 Aug;28:204-210. doi: 10.1016/j.copsyc.2018.12.014. Epub 2018 Dec 27. PMID: 30785067; PMCID: PMC6597336.
10. A Million Random Digits with 100, 000 Normal Deviates. Santa Monica, CA: RAND Corporation, 2001. Available on https://www.rand.org/pubs/monograph_reports/MR1418.html.Last accessed 28 Aug 23.
11. BeMindful. Available onhttps://www.bemindfulonline.com/ Last accessed 28 Aug 23.
12. Hewitt PL, Flett GL, Mosher SW. The Perceived Stress Scale: Factor structure and relation to depression symptoms in a psychiatric sample. Journal of Psychopathology and Behavioral Assessment. 1992;14:247–257.
13. Smit B, Stavrulaki E. The Efficacy of a Mindfulness-Based Intervention for College Students Under Extremely Stressful Conditions Mindfulness (NY) . 2021;12 (12) ;3086–3100.
14. Pal A, Mukhopadhyay P, Datta S, Pal N D. Effect of an online mindfulness program on stress in Indian adults during COVID-19 pandemic, Indian Journal of Psychiatry. 2022;64 4) ;401-407.

Tobacco Cessation Centres: Vital Cog in the Fight against Tobacco Epidemic Preparedness towards a future pandemic

Pushpendra Kaushik[1], Nandita Sharma[2], Mahendra Singh[3], Pradeep Aggarwal[4]

[1] MPH Scholar, [2]Program Manager – Healthy Food for All, [3]Associate Professor, [4]Additional Professor,

Department of Community and Family Medicine, All India Institute of Medical Sciences, Rishikesh, Uttarakhand

Correspondence : : Dr. Pradeep Aggarwal, Email: drpradeep_aggarwal@hotmail.com

Abstract:

The tobacco crisis, which claims more than 8 million lives yearly and adds 1.2 million more from second-hand smoke inhalation, is a serious concern for world health. The detrimental impact of tobacco usage on health is projected to have an annual economic cost of 1.4 trillion US dollars (health costs plus lost productivity) or 1.8% of the world's GDP. Both smokers and users of smokeless tobacco can profit greatly from quitting. Quitting smoking lowers the likelihood of developing respiratory problems, delays their beginning, and slows the progression of chronic lung diseases. Therefore, the "World Health Organisation (WHO)" and the "Ministry of Health & Family Welfare", Government of India, worked together to open official tobacco cessation clinics throughout India. The goal of tobacco cessation centers was to offer to counsel people trying to stop smoking. This includes monitoring the patient's progress and providing counseling, either by itself or in conjunction with medication.

Keywords: Counselling, Tobacco Cessation Centre, Quitting

Introduction:

A grave concern impacting global health is the tobacco emergency, causing the loss of more than 8 million lives annually, with an extra 1.2 million due to second-hand smoke inhalation. A large share of the world's population, amounting to 1.3 billion people, use such items, with roughly 80% located in lower- to middle-income countries; thereby adding significantly to the weight of associated medical issues and deaths in said nations.[1] Each year, a staggering 65 thousand children pass away from conditions linked to inhaling smoke from others' cigarettes, and approximately half of all minors breathe in smog saturated with hazardous substances from tobacco smoke.[2]

According to the Global Adult Tobacco Survey, GATS-2, 2017 in India, 28.6% of adults (more than 15 years of age) use tobacco in any form[3], while 8.5% of students between age 13 to 15 years currently use tobacco in any form (Global Youth Tobacco Survey, GYTS-4, 2019).[4]

In addition to the negative effects that tobacco use has on health, it is estimated that smoking has a total annual economic cost of roughly 1.4 trillion US dollars (combined health costs and productivity losses), or 1.8% of the global GDP. Nearly 40% of this cost is borne by developing nations.[2]

Why to aim for Tobacco Cessation? The Benefits:

Cessation provides significant benefits to both smokers and users of smokeless tobacco. Discontinuing smoking reduces the risk or delays the

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Kaushik P, Sharma N, Singh M, Aggarwal P. Tobacco Cessation Centres: Vital Cog in the Fight against Tobacco Epidemic. Healthline. 2023; 14 (3): 244-247
	DOI : 10.51957/Healthline_ 545_2023	

onset of airflow limitation and hinders the progression of chronic respiratory disease. Blood carbon monoxide levels decrease immediately upon smoking cessation, leading to restored pulse rate and blood pressure with improved taste and smell. Quelling the habit is attached to lower risks for oral cancer, precancerous lesions, dental issues, and cardiovascular disease. Lung cancer, coronary heart disease, and chronic obstructive pulmonary disease dangers are lessened when stopping smoking. Prospective mothers who stop smoking before pregnancy, including during their first trimester, will bear infants with non-smoker birthweights comparable in size.[5]

The Concept of Tobacco Cessation Centres:

Up until 2001, professional services for quitting smoking were not offered in India, despite the serious health and financial effects of the country's widespread tobacco usage. Tobacco cessation services were not professionally organised in India prior to 2001, even though the expense and negative impact on health due to widespread tobacco use were significant. On World No Tobacco Day – May 31, 2002 – the Ministry of Health & Family Welfare, Government of India collaborated with the World Health Organization (WHO) to launch official tobacco cessation clinics in thirteen centers across India. These centers would later be referred to as Tobacco Cessation Centers after 2005. Additional Regional Cancer Centers (RCCs) joined the TCC initiative in 2005 stemming from recognition for its practical application.[6]

Tobacco cessation centers aimed to provide those attempting to quit smoking with therapy. This consists of counseling either alone or alongside pharmacological aid, as well as tracking patient progress.

The expansion of Tobacco Cessation Centres throughout India:

The "National Tobacco Control Programme (NTCP)" was established by the "Government of India" in 2007–2008 with the goal of reducing the burden of morbidities and mortality associated with tobacco consumption in India. Its objectives included raising public awareness of the detrimental consequences of tobacco usage, reducing the production and sale of tobacco goods, assisting smokers in quitting, and facilitating the implementation of tobacco control and prevention strategies recommended by the "WHO Framework Convention on Tobacco Control (COTPA)." The "State Tobacco Control Cell" and district administration have been guided in implementing the NTCP at the state level (State Tobacco Control Cell) and district level ("District Tobacco Control Cell") by the Operational Guidelines that were made public by the "National Tobacco Control Cell (NTCC)."[7]

One of the major activities under District Tobacco Control Cell is setting up Tobacco Cessation Centres (TCCs) in district hospitals and providing free pharmaco-therapy and counseling services at these clinics. As of now, there are 429 Tobacco Cessation Centres under NTCP (maximum number in Uttar Pradesh-80) and around 180 Tobacco Cessation Centres other than NTCP.[8]

Recently, it was made possible for Tobacco Cessation Centres to be established in Indian Dental Schools. Presently, there are 323 Dental colleges affiliated with the "Dental Council of India". So, the establishment of these many TCCs would be of greater help to curb the growing menace of the tobacco epidemic.

Requirements of a Tobacco Cessation Centre:

The first and foremost requirement of running a TCC is the presence of adequate space. There should be a dedicated room in the OPD services for cessation services with sufficient seclusion for the patients to sit and discuss their issues with their therapist.

For a TCC to provide quality cessation services to the population it should be equipped with adequate infrastructure and properly trained manpower. As per the operational guidelines of "National Tobacco

Control Programme," developed by the "Ministry of Health and Family Welfare," one counselor/ psychologist is provided in each "Tobacco Cessation Centre" under NTCP. For the purchase of different instruments, including carbon monoxide monitors and Spiro-meters, which are important in offering comprehensive cessation assistance, funds are also granted by the Government of India under the TCC budget for TCCs operating under the NTCP. The TCC also requires adequate manpower, including doctors, psychologists, medical social workers, computer operators, and attendants. It is also necessary that the staff at the TCC is adequately trained in both psychological and pharmacological interventions. It is recommended that the NTCP organize four yearly training programs for its stakeholders to receive necessary instruction.[9]

Effectiveness of Tobacco Cessation Centres:

In a study reported by P Murthy and S Saddicha,[10] 34,741 patients were registered at the clinics in the first five years, and 23,320 of those cases had baseline data recorded. In 69% of the instances, just behavioral techniques were used, and in 31% of the cases, behavioral counseling was combined with the use of medication, namely bupropion and nicotine gums. At six weeks, 22% had cut their tobacco consumption by at least 50%, and 14% had progressively quit. At 3, 6, and 9 months, the outcomes for younger male patients, smokers of smokeless tobacco, and patients who received both medication and behavioral counseling were relatively better. The extended duration of patient follow-up correlated with an increase in the progression from "not improved" to experiencing improved symptoms. The TCC in Delhi has published encouraging results contrasting the impact of counseling individually versus counseling and medication (bupropion). The counseling group had a sustained abstinence rate of 17%, 17%, 16%, and 15% at 1, 3, 6, and 12 months, whereas the drug treatment group had a rate of 60%, 58%, 54%, and 53% at the same time points. (P 0.001 for all comparisons)[10]

The Way Forward: Making Cessation Centers Mandatory in All Healthcare Institutes

Making tobacco cessation centers mandatory in all healthcare institutes is a great way to move forward in the quest toward a smoke-free generation. Cessation centers provide smokers with doctors, therapists, and psychiatrists who are experienced in helping people quit smoking by using evidence-based strategies, such as counseling and medication. Furthermore, having these centers easily available encourages smokers to take the initiative to stop smoking and live a healthier lifestyle.

Additionally, providing medical and dental students with knowledge and resources about tobacco cessation is key for helping to reduce tobacco use in future generations. By introducing courses in medical and dental colleges related to tobacco cessation treatments, students will gain the necessary skills needed to help patients quit smoking, thus enabling them to become more effective healthcare providers. These programs can also include activities such as putting up posters or holding educational seminars about quitting smoking in order to further educate the general public

Conclusion

Implementing a tobacco cessation center at every medical and dental college can make great progress toward achieving a smoke-free generation. It is well-documented that tobacco causes a variety of health problems and has long-term effects that extend beyond just physical health. Investing in tobacco cessation centers at each medical and dental college will serve as a reminder to future generations that smoking is bad for their health, create a healthier, smoke-free environment, and create more jobs. All in all, introducing such centers would lead to a greater overall health benefit for the community and the world.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References:

1. Tobacco [Internet]. [cited 2023May 18]. Available from: https://www.who.int/news-room/fact-sheets/detail/tobacco
2. Tobacco [Internet]. [cited 2023May18]. Available from: https://www.who.int/health-topics/tobacco#tab=tab_1
3. GATS-2-Highlights-(National-level) 2016-17 [Internet]. Available from: https://nhm.gov.in/NTCP/Surveys-Reports-Publications/GATS-2-Highlights-(National-level).pdf
4. Center for Disease Control. Global Youth Tobacco Survey (GYTS-4) India, Facts Sheet [Internet]. Ministry of Health & Family Welfare, Government of India. 2021. Available from: https://ntcp.nhp.gov.in/assets/document/National_Fact_Sheet_of_fourth_round_of_Global_Youth_Tobacco_Survey_GYTS-4.pdf
5. The Health Benefits of Smoking Cessation - Smoking Cessation - NCBI Bookshelf [Internet]. [cited 2023May18]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK555590/#ch4.s5
6. Varghese C, Kaur J, Desai NG, Murthy P, Malhotra S, Subbakrishna DK, Prasad VM, Munish VG. Initiating tobacco cessation services in India: challenges and opportunities. WHO South-East Asia Journal of Public Health. 2012 Apr 1;1(2):159-68.
7. National Tobacco Control Programme (NTCP)/ :: National Health Mission [Internet]. [cited 2023May18]. Available from: https://nhm.gov.in/index1.php?lang=1&level=2&sublinkid=1052&lid=607
8. Details of Tobacco Cessation Centres / Facilities. 2018; Available from: https://ntcp.nhp.gov.in/assets/document/Tobacco_Cessation_Centres.pdf
9. [Internet]. [cited 2023 Jul 6]. Available from: https://www.nhm.gov.in/NTCP/Manuals_Guidelines/Operational_Guidelines-NTCP.pdf
10. Murthy P, Saddichha S. Tobacco cessation services in India: Recent developments and the need for expansion. Indian journal of cancer. 2010 Jul 1;47(Suppl 1):S69-74.

INSTRUCTIONS FOR AUTHORS

"Healthline" is a quarterly published national journal of Indian Association of Preventive and Social Medicine. "Healthline" aims to promote quality research in the field of Community Medicine and Public health. The editorial board of the journal is committed to an unbiased, independent, anonymous and confidential review of submitted articles. Manuscripts submitted to this Journal, should not have been published or under consideration for publication in any substantial form in any other publication, professional or lay. All the manuscripts once submitted to and published in the Healthline will become the property of the journal.

Aims and Objectives of the Journal:

The "Healthline" journal aims at promotion of high quality medical research by

- Ensuring the accessibility to novel ideas, observations and advanced knowledge for all by adopting open access policy
- Providing a platform to researches in Community Medicine and Public Health
- Improving the visibility of public health issues for concerned stake holders

Process for submission:

Authors are requested to strictly follow the guidelines provided herewith, while preparing the manuscripts for submission to the "Healthline" journal.

Editorial and Peer Review Policy:

The "Heathline" journal follows double blind peer review process. Following receipt of a manuscript from the authors, the manuscript undergoes an editorial review (by editor in chief/executive editor/joint editor). If the manuscript is found appropriate for the further process following the editorial review, the blind manuscript is sent to two anonymous peer reviewers and one statistical reviewer. It is ensured that the reviewers are having qualifications of post-graduation or higher in the concerned subjects and not from the same institute where the authors belong. Upon completion of peer review, the changes suggested by the reviewers are forwarded to the authors and modifications are sought with explanations (if required). The revised manuscript is again forwarded to the concerned reviewers. If the reviewers are satisfied with the revisions from the authors, the manuscript is accepted and formative changes are done for the publication. At any stage of review, if editorial board members or reviewers find the manuscript unsuitable for the publication, the manuscript is rejected.

General Instructions:

The manuscript can be submitted through email to editorhealthline@gmail.com. **The email should contain separate document of Title Page and Original Manuscript inlcuding abstarct both in MS Word as well as Copyright form (duly signed by all the authors), in jpg format. Authors need to attach the approval letter from Institutaional Ethics Committee while submitting the manuscript.** Authors are requested to prepare the article typed in "Times New Roman" fonts with size of "12". Double spacing (including references), should be followed with wide margins. There is no need to send a hard copy.

For any query, kindly reach editorial office through e mail at editorhealthline@gmail.com.

Preparation of Manuscript

Following are the word limits to be followed while submitting an article.

Type of Article	**Maximum Word Limit**
Editorial (by invitation only)	1500
Continuing Medical Education /Review article	4500
Original article *	3000
Short article	1500
Letter to Editor	750
Book review (should not be sponsored by any company/organization)	500

*Excluding abstract, references, tablesand images

Manuscript should be prepared using American English language. Articles exceeding the word limit for a particular category of manuscript would not be processed further. Uniform Requirements for Manuscripts (URM) submitted to Biomedical Journals should be consulted before submission of manuscript (http://www.icmje.org).

Ethical Issues:

All articles should mention how human and animal ethical aspect of the study was addressed. Mention whether informed consent was taken or not. Identifying details should be omitted if they are not essential. When reporting experiment on human subjects, authors should indicate whether the procedures followed were in accordance with the Helsinki Declaration of 1975, as revised in 2000. (http://www.wma.net).

Title page:

This should contain the title of the manuscript, name and designation of all the authors, a short title (not more than 40 letters) to be used as the running title, source of support in the form of grants, equipments, drugs etc., acknowledgement, the institution where the work has been carried out and the address with contact number and email ID of the corresponding author. Briefly mention contribution of each author in multi author article.

Original Manuscript:

Each of the following sections should begin on a separate page. Number all pages in sequence.

Abstract:

Abstract should be a structured condensation of the work not exceeding 250 words for original research articles and 150 words for short communication. It should be structured under the following headings: Introduction, Objectives, Methods, Results, Conclusions, and 3- 5 Key Words to index the subject matter of the article. Please do not make any other heading.

Manuscript:

It must be concise and should include title, Introduction, Material and Methods, Result, Discussion, Conclusion, Recommendations and References. The manuscript should not contain names or any other information related to authors. The matter must be written in a manner, which is easy to understand, and should be restricted to the topic being presented. Insert tables and figures within the text at appropriate places. Written permissions of persons/agency acknowledged should be provided, if applicable.

Conflict of interest and financial support:

The situations where conflict of interest arises are when an author (or the author's institution), reviewer, or editor has financial or personal relationships that inappropriately influence (bias) his or her actions (such relationships are also known as dual commitments, competing interests, or competing loyalties). The potential of influences can vary from the insignificant ones to the significant ones where the results of the reviews or publication process. The conflict of interest can also occur if an individual believes that the relationship affects his or her scientific judgment. Financial relationships (such as employment, consultancies, stock ownership, honoraria, paid expert testimony) are also one of the identifiable conflicts of interest and the most likely to undermine the credibility of the journal, the authors, and of science itself. The other potential conflicts can occur for other reasons, such as academic rivalry, personal relationships and intellectual desire. (Source: International Committee of Medical Journal Editors ("Uniform Requirements for Manuscripts Submitted to Biomedical Journals"), February 2006) A brief statement on source of funding and conflict of interest should be included in the manuscript.

Published Statement of Informed Consent:

The involvement of study participants should be voluntary and following informed consent. Any details disclosing identification of the patients (names, record numbers, contact details, photographs and pedigree) must not be included in the published article. In case, such information is necessary for scientific reasons, an informed consent must be obtained from the study participants or parents/guardian (in case of children less than 18 years of age). Informed consent for this purpose requires that a patient who is identifiable be shown

the manuscript to be published. Authors should identify individuals who provide writing assistance and disclose the funding source for this assistance. Identifying details should be omitted if they are not essential. Complete anonymity is difficult to achieve, however, and informed consent should be obtained if there is any doubt. If identifying characteristics are altered to protect anonymity, authors should provide assurance that alterations do not distort scientific meaning and editors should so note. When informed consent has been obtained it should be indicated in the published article. (Source: International Committee of Medical Journal Editors ("Uniform Requirements for Manuscripts Submitted to Biomedical Journals"), February 2006)

Data Sharing Policy:

The authors must submit a statement of data sharing that, the data pertaining to original articles, published in "Healthline" journal must be provided, without restrictions, whenever asked for by the editorial board of the journal. Failure to comply this condition may lead to rejection of the article.

References:

In citing other work, only reference consulted in original should be included. If it is against citation by others, this should be so stated. Signed permission is required for use of data from persons cited in personal communication. ANSI standard style adapted by the National Library of Medicine (NLM) should be followed. Consult http://www.nlm.nih.gov/bsd/uniform_requirements.html. References should be numbered and listed consecutively in the order in which they are first cited in the text and should be identified in the text, tables and legends by Arabic numerals as **superscripts in square brackets (as example shown below)**. The full list of reference at the end of the paper should include; names and initials of all authors up to six (if more than 6, only the first 6 are given followed by et al.); the title of the paper, the journal title abbreviation according to the style of Index Medicus (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=journals), year of publication; volume number; first and last page numbers. Reference of books should give the names and initials of the authors, book title, place of publication, publisher and year; those with multiple authors should also include the chapter title, first and last page numbers and names and initials of editors. For citing website references, give the complete URL of the website, followed by date of accession of the website. Quote such references as - author name, title of the article, the website address, and date of accession.

Citation: Several research studies have revealed gap between facts and beliefs of adolescent girls and showed that there is low level of awareness about menstruation among girls when they first experience it.[4]

Journals: Mehta MN, Mehta NJ. Serum lipids and ABO Blood group in cord blood of neonates. Indian J Pediatr.1984; 51:39-43.

Book: Smith GDL. Chronic ear disease. Edinburgh: Churchill Livingstone; 1980.

Chapter in the Book: Malhotra KC. Medicogenetics. problems of Indian tribes. In: Verma IC, editor. Medical genetics in India.vol. 2. Pondicherry: Auroma Entrprises; 1978. p. 51-55.

Papers accepted but not yet published should be included in the references followed by 'in press". Those in preparation, personal communications and unpublished observations should be referred to as such in the text only. Total number of references should not be more than 25 for an Original article.

Illustrations (Maximum 4):

These should be of the highest quality, **preferably black and white and editable**. Graphs should be drawn by the artist or prepared using standard computer software. Number all illustrations with Arabic numerals (1, 2, 3 ....).

Legends:

A descriptive legend must accompany each illustration and must define all abbreviations used therein.

Tables (Maximum 4):

These must be self–explanatory and must not duplicate information in the text. Each table must have a title and should be numbered with Arabic numerals. Each table should be typed in double space in results' section. All tables should be cited in the text.

Abbreviation:

As there are no universally accepted abbreviations, authors should use familiar ones and should define them when used first in the text.

Short Communication

For preparing a manuscript for short communication, please follow the same guidelines as Original Manuscript given above. The world count for Short Communication should be limited to 1,500 words with abstract not exceeding 150 words. Number of tables and/ or figures should be limited to 3 and number of references should not be more than 12.

Letter to the Editor:

It should be short and decisive observations. They should preferably be related to articles previously published in the Journal or views expressed in the journal. The word limit of 750 with no more than 5 references.

Manuscript Processing Charges:

The manuscript processing charges are applicable at the time of acceptance of the manuscript for the publications in "Healthline" journal, as mentioned below. Charges are applicable to all the manuscripts submitted to Healthline Jounral from 1st April 2023 onwards. (No upfront payment shall be accepted)

- **First author – IAPSM Member : Rs. 5000**
- **First author–Non-IAPSM Member : Rs. 7000**

(Applicable for Letter to Editor, Original Article, Review Article, Short Communication & Book review)

The charges as mentioned above can be paid by cheque / online transfer in favour of below mentioned account.

Name of Account : HEALTHLINE IAPSMGC	
Account Number : 34898725422	
IFSC Code :	SBIN0003043
Address :	State Bank of India, Civil Hospital Precincts Branch, Opp. B. J. Medical College, PO Bag No. 1, Ahmedabad-380016
MICR Code :	380002011

Following online payment of charges, the receipt of fund transfer should be emailed to editorhealthline@gmail.com.

If paid by cheque, duly prepared cheque should be sent to **Dr. Viral Dave, Editor in chief, Community Medicine Department, GCS Medical College, Opp. DRM Office, Nr. Chamunda Bridge, Naroda Road, Ahmedabad-380025, Gujarat, India.**

Advertisement Policy:

Being a national journal of Indian Association of Preventive and Social Medicine, "Healthline" has a reach to more than 4200 members of IAPSM, government health officials, Post Graduate students, epidemiologists, medical institutions and medical faculties across the country. It can provide a highly cost effective mode of advertising and passing the desired message to the targeted population.

"Healthline" provides the option of print advertisement on the pages of the printed issues of the journal. The rates for the same are as below.

Advertisement Type	Charges (INR) per Issue
Outer Back Cover (Full Page) Colour	25000
Inner Back Cover (Full Page) Colour	10000
Inner Back Cover (Half Page) Colour	7500

For advertisement or any query, please contact,

Editor in Chief, "Healthline" journal, Professor & Head, Community Medicine Department, GCS Medical College, Opp. DRM Office, Naroda Road, Ahmedabad-380025

Email: editorhealthline@gmail.com, Contact no.: +917966048351

COPYRIGHT FORM

Undertaking by Authors

We, the undersigned, give an undertaking to the following effect with regard to our manuscript entitled_____ _____"submitted for publication in Healthline journal :

1. The manuscript mentioned above has not been published or submitted to or accepted for publication in any form, in any other journal.
2. We also vouchsafe that the authorship of this manuscript will not be contested by anyone whose name(s) is/are not listed by us here.
3. I/We declare that I/We contributed significantly towards the research study i.e., (a) conception, design and/or analysis and interpretation of data and to (b) drafting the manuscript or revising it critically for important intellectual content and on (c) final approval of the ver sion to be published.
4. I/We hereby acknowledge the "Healthline" journal - conflict of interest policy requirement to carefully avoid direct and indirect conflicts of interest and, accordingly, hereby agree to promptly inform the editor or editor's designee of any business, commercial, or other proprietary support, relationships, or interests that I/We may have which relate directly or indirectly to the subject of the work.
5. I/We solemnly declare that the data pertaining to original manuscript, published in "Healthline" journal shall be provided, without restrictions, whenever asked for by the editorial board of the journal.
6. I/We also agree to the authorship of the manuscript in the following sequence:-

Name of author	**Signature with Date**	**Mobile Number**
1._____	_____	_____
2._____	_____	_____
3._____	_____	_____
4._____	_____	_____
5._____	_____	_____
6._____	_____	_____

Scanned copy of completed and duly signed declaration form should be emailed to the Editor/Publisher at **editorhealthline@gmail.com.**

HEALTHLINE JOURNAL

A National Journal of

Indian Association of Preventive and Social Medicine managed by IAPSM-GC

Volume : 14 Issue : 3 (July - September 2023)

INDEX

STAR - COM MED
2023

STAR – COM MED 2023

SEARCH TALENT AND REWARDIN COMMUNITY MEDICINE

(An Initiative of IAPSM as observance of Golden Jubilee Celebration (1974-2023)

"Nationwide Online Research Presentation Competition"

- Open to all IAPSM Life members with No bar of Age or Designation
- No Registration fees
- Presentations must be based on original studies done after 01/01/2021
- Winners will be selected through a transparent system & will receive Certificates, Customized Crafted mementos and Prizes worth thousands of rupees

Last date of Registration: 31st October 2023

For other timelines and details, please Click on the Link: **http://iapsm.org/commed-2023.html**

Dr. A. M. Kadri
President
IAPSM

Dr. Purushottam Giri
Secretary General
IAPSM

Dr. Pradeep Kumar
Chairperson
STAR-COMMED23

- To ensure maximum participation, circulate in other academic groups also.
- For Eligibility and technical guidelines, please refer the link given above.
- For any query or clarification (s), participants may contact **Dr. Pradeep Kumar**

(Email: drpkumar_55@yahoo.com & Mobile: 8238414559)