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BURDEN OF NON-COMMUNICABLE DISEASES AND ASSESSMENT OF RISK FACTORS FOR THESE AMONG POST GRADUATE TRAINEE DOCTORS IN RNT MEDICAL COLLEGE, UDAIPUR, RAJASTHAN AND ATTACHED TERTIARY CARE HOSPITALS: A CROSS SECTIONAL STUDY

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Abstract

Background: Non-communicable diseases (NCDs) cause 17 million premature deaths annually, with 86% in low- and middle-income countries. In India, risk factors like tobacco use, physical inactivity, and unhealthy diets are prevalent. Postgraduate doctors in government hospitals face heightened NCD risks due to high stress, long hours, and poor self-care. This study assesses the prevalence and associated risk factors of NCDs among PG students in a government medical college.

Materials and Methods: It was a hospital based cross-sectional study among 220 post-graduates students above 30 years of age from all departments. Data were collected through a pre-tested questionnaire using face-to-face interview methods. A statistical test was used to determine the associated risk factors.

Results: Out of 220 subjects, the majority were male 153 (69.50%). 45.90% had a positive family history of NCD. Among the study subjects 37 (16.81%) have a sedentary lifestyle and only 4.50% subjects have a highly active lifestyle. A significant association between alcohol, smoking, fast-food consumption, exercise intensity and daily routine life with their PG branch is seen.

Conclusion: It was found that significant prevalence of risk factors of NCDs emphasizes the importance of interventions to reduce these risk factors. There is a huge opportunity to reduce modifiable risk factors among our future doctors by encouraging them to change their behavior related lifestyles such as smoking habits, alcohol use, junk food and physical inactivity.

Keywords: Non-communicable diseases (NCDs), Post Graduate Doctors, Lifestyle, Chronic disease, Alcohol, Tobacco

BACKGROUND:

Non-communicable diseases (NCDs), which include cardiovascular diseases (such as heart attacks and strokes), cancers, chronic respiratory diseases (such as chronic obstructive

pulmonary disease and asthma), and diabetes, are a major global health concern. Annually, 17 million people die prematurely from these conditions before reaching the age of 70. Alarmingly, 86% of these early deaths occur in low- and middle-income countries, where access to healthcare and preventive measures is often limited. These regions face a significant burden, exacerbated by inadequate resources and healthcare infrastructure, making the prevention and management of NCDs a critical public health challenge[1,2]

Modifiable risk factors for NCDs include inactivity, tobacco and alcohol use, and poor diets. Non-modifiable risks like age, genetics, and metabolic factors (e.g., high blood pressure, cholesterol, glucose, and obesity) also contribute, emphasizing the need for prevention and early intervention [3]

Tobacco use stands out as a significant risk factor for NCDs in India, contributing to nearly 1.35 million deaths annually [4]. Concurrently, smoking tobacco affects 10.38% of adults. [5]

Unhealthy diet and poor nutrition represent significant risk factors for NCDs like cardiovascular diseases, diabetes, and cancer [6-8]. Physical inactivity emerges as a significant risk factor for NCDs in India, with studies reporting varying prevalence rates ranging from 20.3% to 66.8%.

The WHO recommends a cumulative engagement of at least 150 minutes per week of moderate physical activity to enhance physiological functioning, quality of life, and social and work participation [9].

To address the growing burden of NCDs in India, the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS) was initiated in 2010. The program aimed to strengthen healthcare infrastructure, enhance human resource capacity, promote health awareness, and facilitate early diagnosis, management, and referral services for major NCDs [10]

Post-graduate (PG) doctors in India face high stress, long hours, and erratic schedules, leading to sedentary lifestyles, poor dietary habits, and limited self-care. Stressful work environments and prioritizing patient care over personal health contribute to increased risk factors for non-communicable diseases among these professionals. A govt. The medical college has a heavy OPD, IPD, Emergency, and Trauma patients load. PGs have to be always available to treat patients and handle emergencies. In this context this study was aimed to assess NCD prevalence and its risk factors among PG students in a government hospital.

Objectives:

1. To assess the burden of NCDs among the Post graduate students.
2. To identify modifiable Risk Factors for NCD among them.
3. To compare the same among PGs working in clinical stream with those in pre and para clinical stream.
4. To provide insights for targeted interventions and health promotion strategies to mitigate the burden of NCDs among the PG students.

METHODOLOGY:

Study design: Hospital based Cross sectional study

Study location: RNT Medical College, Udaipur, Rajasthan.

Study population: All the P.G. Residents of RNT MEDICAL COLLEGE UDAIPUR.

Data collection: By questionnaire and face to face interview

Data collection tool: A pretested semi structured questionnaire.

The data collection instrument was developed using the WHO STEPS NCD Risk Factor survey questionnaire with required modification [(11)]. The questionnaire consisted of 03 (three) sections including personal information (Name, Sex, PG branch, Address), behavioural information (smoking per day, alcohol consumption per week, daily routine life and physical activity, physical exercise per week sleeping time, dietary habit related to fast food consumption per week, fruit and vegetables consumption; and history regarding NCDs.) and obesity.

Here smoking includes bidi, cigarettes, cigars, pipes, hookah and e-cigarettes. And smokeless tobacco means tobacco, khaini, gutkha chewable etc. All the residents have a different daily routine in which Sedentary lifestyle means (mostly sitting, with little physical movement) Lightly active (some walking or light activities), Moderately active (regular moderate exercise or physical activity) and Highly active (strenuous exercise or vigorous physical activity) considered.

Moderate to vigorous physical activities such as brisk walking, jogging, cycling, swimming, or aerobics and gym exercise included. In Intensity of Physical Activity Low intensity (little to no increase in heart rate or breathing), Moderate intensity (noticeable increase in heart rate and breathing) and High intensity (significant increase in heart rate and breathing, sweating) are questioned by participants.

Stress level of pg. Students are asked on a 1 to 10 scale level in which 1 to 3 levels are called normal level, 4 to 5 low stress level, 6 to 8 level medium stress and 9 to 10 are high stress levels considered according to WHO. Data were collected using a self-administered English version of the online questionnaire (Google form) which was shared via Email, WhatsApp, and Messenger, and few participants were contacted over the phone.

Study period: The duration of this study was from July 2024 to October 2024 where data Collection was done in August and September 2024 After IEC approval.
Study population: There were a total 570 post-graduates students registered in clinical and non- clinical branches in the institute. In this study both para-clinical branches (Anatomy, Biochemistry, Physiology, Pharmacology, PSM, Pathology, Forensic medicine, Microbiology) and Clinical (Medicine, Surgery, OBG, Orthopedics, Pediatrics, Respiratory medicine, ENT, Ophthalmology), branches students were taken.

Study participants
All the residents doing post-graduation in different clinical and para clinical branches from RNT

Medical College Udaipur were the study population. A list of postgraduate students was collected from the administration office. All PG students fulfilling inclusion criteria will be included in the study.

INCLUSION CRITERIA:

- Residents above age 30 years as Type 2 Diabetes Mellitus (T2DM) is the commonest type of Diabetes which occurs usually after thirties.
- Subjects willing to participate in the study by giving written consent

EXCLUSION CRITERIA

- Pregnant female

Sample Size: There are 245 PG students of age thirty years and above out of 570 students. Assuming a non-response rate of 10%, the sample size will be **220**.

Sample technique: Convenient purposive sampling as per the inclusion criteria

ETHICAL CONSIDERATION: Potential participants were informed the purpose of study and written informed consent was taken without any persuasions by the investigator. Participants had freedom to execute voluntary acceptance or refusal for study at any stage. Confidentiality and importance of responses was conveyed to them. Preventive corrective measures were informed to the subjects and attendants immediately after collecting data from them. The study was carried forward only after approval from the institutional ethics committee.

DATA CODING: The data collected was categorized according to different variables and further categorized data was entered on a master chart created in MS Excel 2021 (Office 365, Microsoft Company Ltd., USA).

STATISTICAL METHODS USED: Data were cleaned and edited using Microsoft Excel 2021. The Chi-square test ($\chi 2$) for categorical variables was performed by the Statistical Package for Social Sciences (SPSS) version 25.0 for Windows (SPSS, Inc., Chicago, IL, USA).

To see the association of the NCD risk factors among para clinical and clinical group participants. The statistical tests were Considered significant at a level of **p<0.05**. Coded data was analyzed using statistical software SPSS (earlier, Statistical Product for Social Sciences; later, Statistical Product and Service Solutions) version 25.0. [IBM SPSS Software, Chicago, IL, USA].

RESULT:

Among study subjects (n=220) male (69.50%) were more than female (30%) students. All study subjects were thirty years or above age. Among them 72%were Hindu, 9% Muslims and 18% other religions. Out of total participants 117 (53%) were clinical streams and 103(46%) were para clinical branches. Among total participants 55% were married and 45% were unmarried (table 1.)

Table1: Demographic profile of study subjects.(n=220)			
variable		**Frequency**	**Percentage (%)**
Gender	Male	153	69.50%
	Female	67	30%
Religion	Hindu	160	72%
	Muslim	20	9%
	Others	40	18%
Specialty	Clinical	117	53%
	Para-Clinical	103	46%
Marital status	Married	121	55%
	Unmarried	99	45%

Among study participants 45.90% had a positive family history of non-communicable disease. (Table 2).

Table 2 : Family history of NCD among study participants(n=220)		
Variable	**Frequency**	**Percentage (%)**
Positive	101	45.90%
Negative	119	54.09%

In this study 0.45% of study participants had cardiovascular disease, 6.36% had diabetes, 6.81% have hypertension, 0.45% had chronic respiratory disease and 65.90% had no NCDs.(Table 3)

Table 3: NCD among study participants (n=220)

Variable		Frequency	Percentage (%)
NON-COMMUNICABLE DISEASE	CVD	1	0.45%
	Diabetes	14	6.36%
	HTN	15	6.81%

	Chronic Respiratory Disease	1	0.45%
	Other	44	20%
	No disease	145	65.90%

Among the study participants only 39 (17.72%) are current smokers. In smokers 64% subjects smokes cigarettes 1or 2 daily, 23.07% smokes 2 or 3 and only 12.82% smokes 4 or more cigarettes daily. (Table: 4)

Not any subject found consuming tobacco or taking smokeless tobacco.

Table 4: Distribution of smoking status in study subjects (n=220)

Variable		Frequency	Percentage
Smoker		39	17.72%
Non-smoker		181	82.27%
Smoking status per day among smoker (n=39)			
1 or less than 1		25	64.00%
2 or 3		9	23.07%
4 or more		5	12.82%

Among study subjects 37 (16.81%) have a sedentary lifestyle and only 4.50% subjects have a highly active lifestyle. Rest 32.72 % have lightly active and 45.90% have moderately active life style.(Table:5)

Table 5: Distribution of status of present life style (n=220)

Variable	frequency(no.)	Percentage
Highly Active	10	4.50%
Lightly Active	72	32.72%
Moderately Active	101	45.90%
Sedentary	37	16.81%

In study participants 80 (36.36%) consume alcohol in which (34)42.50% consume one or two drinks, 36.25%three or four drinks and 16.25% five or six drinks per week. Mostly 68.75% consume alcohol from the past three years and only 1.25% consume from the past one month (Table: 6) & as depicted in figures below.

Table 6: Distribution of Alcohol consumption in study subjects (220)			
	Variable	**Frequency**	**percentage**
Consume alcohol	yes	80	36.36%
	no	140	63.63%
Drinks per week	1-2 drinks per week	34	42.50%
	3-4 drinks per week	29	36.25%
	5-6 drinks per week	13	16.25%
	7-10 drinks per week	4	5%
Duration of consuming alcohol (past)	1-2 month	1	1.25%
	6 month or above	5	6.25
	1-2 year	20	25%
	3 year or more	55	68.75%

Out of 220 study subjects 202 (91.81%) students do exercise and 18 (8.18%) don't . Among all participants only 23.18% do exercise 5 or 6 days in a week, 24.54% three or four days, 17.27% two days and 26.81% one day or not in a week. Among all residents 98 (44.54%) do low intensity exercise. Only 5.90% of students do high intensity exercise. (Table :7)

Table 7: Distribution of status of structured activity or physical exercise			
Variable		**frequency(no.)**	**Percentage**
Physical exercise	Yes	202	91.81%
	No	18	8.18%
Physical exercise days per week	1 day per week or not	59	26.81%
	2 days per week	38	17.27%
	3or4 days	54	24.54%

	5or 6 days	51	23.18%
Physical exercise intensity	Low intensity	98	44.54
	Moderate intensity	103	46.81%
	High intensity	13	5.90%

In this study maximum people 127 (57.72%) accepted that they have lack of time to do exercise daily. 20.90% of students don't engage in physical activity due to lack of motivation and 4.54 % think that they don't have a safe and suitable place for exercise.(Table:8)

Table 8: Distribution of Reasons for not doing physical exercise or activity

variable	frequency(no.)	percentage
Lack of time	127	57.72%
Lack of motivation	46	20.90%
health related issue	7	3.18%
financial reason	2	0.90%
Lack of safe and suitable places	10	4.54%
other reason	28	12.72%

We examined the association between smoking status and their postgraduate (PG) branches (para clinical vs. clinical). Out of 220 participants, 12 smokers were found in para clinical branches, while 27 in clinical branches. Among non-smokers, 91 were para clinical and 90 from clinical branches. A chi-square test revealed a statistically significant association between smoking status and PG branch selection ($\chi^2 = 4.9$, $p = 0.027$).(Table:9)

TABLE 9: ASSOCIATION OF SMOKING WITH PG BRANCHES

		PARACLINICAL	CLINICAL	P VALUE
SMOKING	YES	12	27	0.027
	NO	91	90	
	TOTAL	103	117	

Among participants, 13 individuals who consumed 1-2 drinks per week are of para clinical branches, while 21 are of clinical branches. For those consuming 3-4 drinks per week, 19 were para clinical and 10 were clinical branches. In the 5-6 drinks per week category, 1 participant is of para clinical, whereas 12 is of clinical. Lastly, in the 7-10 drinks per week category, 1 subject is of para clinical, and 3 subjects is of clinical branches.

A chi-square test showed a statistically significant association between alcohol consumption

and PG branch selection (p = 0.004), indicating that higher alcohol intake was comparatively on a higher side in clinical branches.(Table:10)

TABLE 10: ASSOCIATION OF ALCOHOL DRINKS PER WEEK WITH PG BRANCHES				
		PARACLINICAL	**CLINICAL**	**P VALUE**
Drinks per week	1-2 drinks per week	13	21	0.004
	3-4 drinks per week	19	10	
	5-6 drinks per week	1	12	
	7-10 drinks per week	1	3	

The study examined the association between exercise intensity and postgraduate (PG) branches (Paraclinical vs. Clinical). A chi-square test was performed, yielding a chi-square value of **9.504** and a **p-value of 0.023**, indicating a **statistically significant relationship** between exercise intensity and PG branch. This suggests a notable difference in exercise intensity between the two branches, particularly with fewer Clinical students engaging in high-intensity exercise. (Table:11)

TABLE 11: ASSOCIATION OF exercise intensity with PG BRANCHES				
		PARACLINICAL	**CLINICAL**	**P VALUE**
Exercise intensity	High intensity	11	2	0.023
	Moderate intensity	43	60	
	Low intensity	45	53	
	No activity	4	2	

This study examines how often postgraduate students from different branches (Para clinical and Clinical) consume fast food and whether there's a significant association between their fast food habits and their field of work. A Chi-square test revealed a statistically significant association between the fast-food consumption habits of students from Para clinical and Clinical branches (Chi-square = 17.653, P = 0.007). This suggests that the frequency of fast food intake is associated with the branch of study, with the differences unlikely to be due to chance.(Table 12)

TABLE 12: ASSOCIATION OF fast-food intake with PG BRANCHES				
		PARACLINICAL	**CLINICAL**	**P VALUE**
Fast food per week	once in a week	21	10	

	twice in week	23	18	0.007
	2-3 day in week	6	13	
	3-4 days in week	10	11	
	4-5 days in week	5	1	
	seldom in a month	26	52	
	no fast food	12	12	

The study explored the association between daily routine activity levels and postgraduate (PG) branches (Para clinical vs. Clinical). A chi-square test showed a **significant association** between daily routine life and PG branches, with a chi-square value of **9.88** and a **p-value of 0.02**. The results indicate a significant association in daily activity levels, with Para clinical students being more sedentary, while Clinical students tend to have higher levels of activity.(Table 13)

TABLE 13: Association of daily routine life with PG Branches

		PARACLINICAL	**CLINICAL**	**P VALUE**
Daily routine life	Highly Active	4	6	**0.02**
	Lightly Active	31	41	
	Moderately Active	42	59	
	Sedentary	26	11	
	Total	103	117	

There is no significant association between branches and per day smoking, alcohol consumption, and duration of drinking alcohol, physical exercise and breakfast.

DISCUSSION:

Demographic profile

Present study was conducted on post graduate students of RNT Medical College Udaipur,

Rajasthan. In this study among study subjects (n=220) male students were more than female students. All study subjects were thirty years or above age. Among them 72%were Hindu, 9% Muslims and 18%other religions. Out of total participants 117 (53%) were clinical streams and 103(46%) were para clinical branches. Among total participants 55% were married and 45% were unmarried.

Tobacco use

Among the study subjects 17.72% were smoking currently. Among smokers 64% of subjects smoked one or two cigarettes daily, 23.07% smoked two or three and only 12.82% smoked four or more cigarettes daily. There were no subjects with a history of smokeless tobacco consumption.

The prevalence of smoking among doctors in the current study was 17.72%. This figure was high compared to findings from the study **Kiran Prakash et al. (2019)[12]** in Andhra Pradesh, which reported that 14.61% doctors of Indian adults are tobacco smokers. In this study, no female doctors were found to be smokers, with tobacco use being seen only in male doctors, reflecting a broader trend in India where men are more likely to engage in this unhealthy habit.

A cross-sectional study by **Kawatra et al**.**(2023)[13]** in Bikaner, Rajasthan, found that 9.85% of doctors smoked. The much lower prevalence of smoking observed in Bikaner, compared to the present study, could be attributed to cultural and regional differences. It may also be due to the fact that the Udaipur study involved young medical students, who were likely more enthusiastic about smoking during their college years.

Alcohol use:

Regarding alcohol consumption, the present study considered only male doctors, as no female doctors were consuming alcohol. The prevalence of alcohol use among doctors was 36.36%, which was similar to other studies conducted on doctors, such as **Kawatra et al**. (2023) **[13]** in Bikaner (33.33%), and higher than the study by Kiran Prakash et al. (2019) (21.91%). This indicates that alcohol use among doctors was almost equal to that of the general population. The higher alcohol consumption rates could be attributed to geographical and cultural differences.

Physical inactivity

37/220 (16.81%) subjects have a sedentary lifestyle and only 65% residents do physical exercise. This was higher than other studies such as **Kiran Prakash et al. (2019)[12]** which reported lower physical exercise level (39.68%) and 60.31% sedentary life. The higher rate of physical exercise in Udaipur among doctors may be due to young age.

In terms of diet, 57.72% of doctors were found to have an adequate intake of fruits and vegetables similar to studies like the **Kiran Prakash et al.2019[12]** (58.02%) and higher than **Sumita Sandhu et al.(2015)[14]** in Himachal Pradesh (33%).This indicates that doctors in this study had a comparatively better consumption of fruits and vegetables, potentially due to differences in socio- economic and educational backgrounds.

Summary and conclusion:

Among study subjects 45.90% have a positive family history for NCD, 17.72% had smoking habits, 36.36% consumed alcohol and 42.27% did not take daily fruits and vegetables. Among

study subjects 8.18% did not engage in any physical exercise and 16.81% had a sedentary lifestyle and 10.45% had high stress .

It is found that significant prevalence of risk factors of NCDs emphasizes the importance of interventions to reduce these risk factors. There is a huge opportunity to reduce modifiable risk factors among our future doctors by encouraging them to change their behavior related lifestyles such as smoking habits, alcohol use, junk food and physical inactivity.

Recommendation and Preventive measures:
Non-communicable diseases (NCDs) are a major concern among postgraduate students due to factors such as stress, sedentary lifestyle, and unhealthy eating habits. The current study highlights a significant prevalence of risk factors for Non-Communicable Diseases (NCDs), stressing the need for interventions to mitigate these risks. It underscores the potential for reducing modifiable risk factors by encouraging future doctors to change behavior-related lifestyle habits such as smoking, alcohol consumption, and junk food intake.

Below are the recommendations and preventive measures to reduce the risk of NCDs among this group:

Implementing a ban on smoking in hostels, college campuses, and canteen workplaces to minimize exposure to secondhand smoke.

Individuals are advised to engage in at least 30 minutes of physical activity most days of the week.

Multicenter surveys should be conducted to assess the global prevalence of risk factors among physicians. Additionally, studies that evaluate the effectiveness of structured physical activity programs in reducing non-communicable diseases and associated risk factors among physicians are recommended.

While the current study has identified significant risk factors contributing to Non-Communicable Diseases (NCDs) in doctors, further detailed research into these factors is strongly needed.

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