**Title:** Assessment of Medication Adherence in Non Communicable Diseases in Manipur State, India: Challenges during COVID-19 Pandemic with Impact on Lifestyle Pattern

**Short title:** Lifestyle Pattern of NCD Patients during COVID-19

**Authors:**

1. Dr Renu Bala

MD

Research Officer,

Regional Research Institute (H), Imphal

New Checkon, Opposite Tribal Colony,

Imphal East, Manipur- 795001

Mob: 9140570079

[drrenu3011@gmail.com](mailto:drrenu3011@gmail.com)

2. Dr Amit Srivastava

MD

Research Officer,

Regional Research Institute (H), Imphal

New Checkon, Opposite Tribal Colony,

Imphal East, Manipur- 795001

Mob: 9140577532

[amitdr911@gmail.com](mailto:amitdr911@gmail.com)

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**Abstract**

Coronavirus disease (COVID-19) poses an unprecedented challenge and adversely affecting the lifestyle of people with non-communicable diseases (NCDs) due to enforced restrictions by the governments. The study aimed to assess medication adherence, physical activity, prophylactic behavior, change in sleep, alcohol intake and tobacco consumption during the enforced lockdown and recruited subjects from NCD patients visiting the institute’s outpatient department. Questions were formed on prophylactic behaviour, changes in sleep, alcohol and tobacco consumption along with validated scales like Morisky Medication Adherence Scale (MMAS) and International Physical Activity Questionnaire (IPAQ) Short Form**.** The study conducted in the month of August 2020 recruited 413 subjects with mean age of 54.34 years. Medium medication adherence exhibited by 77.48% subjects was significant among hypertension (*P*= 0.000) while low adherence was significant among Chronic Obstructive Pulmonary Disease/Asthma (*P*= 0.000) subjects. The median IPAQ score was 536 MET-minutes/week with 41.96% of the subjects demonstrating low physical activity. A statistically significant difference between the IPAQ scores was found among different NCD groups (*P*= 0.009). There was a statistically significant decrease in number of hours of sleep during the pandemic as compared to before the pandemic (*P*= 0.000). Furthermore, there was a significant change in tobacco consumption (*P*= 0.000) and alcohol consumption (*P*= 0.000) during the pandemic. The subjects followed preventive practices largely.The study highlighted that the NCD patients should strictly adhere to their medication, follow an optimal physical activity schedule, take proper sleep and continue following prophylactic behavior.

**Keywords:** Coronavirus; COVID-19; Lifestyle; Medication adherence; Noncommunicable diseases; Physical exercise; Morisky Medication Adherence Scale (MMAS); International Physical Activity Questionnaire (IPAQ) Short Form

**Introduction**

An outbreak of novel coronavirus (SARS-CoV-2) infection was first reported in Wuhan, China in December 2019 that spread rapidly to rest of the world and was declared a pandemic by the World Health Organization (WHO) [1]. Coronavirus disease (COVID-19) alters the overall mortality and burden of disease through impact on non-communicable diseases (NCDs) [2]. NCDs kill approximately 41 million people worldwide each year, which will increase to 55 million by 2030. In India, nearly 5.8 million people die from NCDs every year. Physical inactivity, unhealthy diets, tobacco use and harmful use of alcohol are the main behavioral risk factors for NCDs [3].

During the pandemic, the most prevalent comorbidities were hypertension (HTN) and diabetes mellitus (DM), followed by cardiovascular diseases (CVD) and respiratory system diseases [4]. Worldwide, one in five peopleare at an increased risk of severe COVID-19 ifthey become infected, mostly because of underlyingNCDs [2]. For this reason, NCD patients are urged to stay at home without their routine medical follow-up though it may increase the risk of worse outcomes due to reduced mobility [5,6]. Furthermore, they need long term medications which may be difficult to access during the pandemic especially in remote areas [7].

Healthcare systems began postponing and scaling down some aspects of routine NCD management, outpatient visits, and non-urgent surgery to avoid unnecessary hospital visits, reduce the burden on hospitals, and decrease infection risk [8]. Indian Government initiated containment measures with different approaches [9]. Self isolation recommendations were particularly targeted to older persons and/or to individuals with chronic medical conditions but these restrictions inevitably reduced opportunities to exercise which is essential for controlling symptoms and risk factors [10].

The imposed restrictions may have relevant clinical implications in terms of drug adherence, daily functioning and nighttime sleep, deleterious effects of insufficient physical activity and change in smoking and drinking behavior. This study aimed to assess the medication adherence, lifestyle pattern of persons suffering from NCDs and preventive behavior displayed during the time of COVID-19 pandemic.

**Methodology**

**Study Setting**

A cross-sectional study was conducted from 3rd August to 01st September 2020 among patients with NCD who were under treatment at the outpatient department (OPD) of author’s institute. The state government had enforced an extended lockdown due to COVID-19 pandemic in the region till 31st August 2020 [11]. Participants aged 18 years or above who agreed to participate were included in the study after taking written informed consent.

**Study Procedure**

The proportion of burden of NCDs in the region is around 58.5% [12].Open-Epi software was used for calculating the sample size [13]. Considering level of significance 5% (confidence interval 95%) and design effect of one, the estimated sample size for the study was 373. However, the study recruited 413 participants, so the confidence limit was increased to 95.8%. The study was approved by the Institutional Ethical Committee of the authors’ institute.

**Study instruments**

The study questionnaire was in the English language. Participant’s socio-demographic characteristics were recorded in a pre-designed format.

The questionnaire in this study included questions from scales that are:

* Questions on preventive behavior were formed as per the recommendations of Ministry of Health and Family Welfare (MoHFW), Government of India [14]. A total of thirteen questions were formed to assess the practices adopted by the participants. Each question was measured on a five-point Likert scale with response choices ranging from “not at all” (1) to “always” (5). Scores of the 13 items were summed, yielding a minimum score of 13 and a maximum score of 65 with higher scores indicating better practices.
* Questions were formed to assess changes in sleeping pattern, smoking/tobacco habit and alcohol intake during the pandemic as compared to the period before the pandemic. One question each enquired the number of hours of sleep, consumption of tobacco or cigarettes and alcohol intake before the pandemic. Similarly, one question each enquired the same during the pandemic.
* *Morisky Medication Adherence Scale (MMAS):* Taking medication on time is crucial for the successful management of chronic illness. MMAS is an accurate method of measuring adherence to more accurately assess and formulate a method of intervention to improve adherence [15].
* *International Physical Activity Questionnaire (IPAQ) Short Form***:** This scale assesses the types of intensity of physical activity and sitting time that people do as part of their daily lives. The obtained data was cleaned and processed as per the scale guidelines and the IPAQ analysis was performed on 348 participants. The total physical activity was calculated and expressed as median metabolic equivalent task–minutes/week (MET) [16].

**Statistical Analysis**

The information gathered was entered into a spreadsheet and statistical tests were performed using Microsoft Excel software. The descriptive analysis gave frequency, percentage, mean scores, and standard deviation (SD) of response while median MET–minutes/week and inter-quartile range (IQR) was used for IPAQ scores. Analysis of variance (ANOVA) or t-test was performed for preventive behavior and a Chi-square test was conducted for medication adherence to identify any significant difference depending on demographic variables. A paired t-test was performed to assess the difference in sleeping habits before and during the pandemic. A Wilcoxon signed rank test was performed to assess the significant difference in smoking and drinking habits before and during the pandemic. The IPAQ data was processed and after cleaning of the data, nonparametric test of Mann-Whitney U test or Kruskal Wallis H test was performed on this sub-sample of 348 subjectsto find if any significant difference exists between the groups. The p-value was kept at 0.05. The post-hoc test revealed groups that were significantly different from each other. For medication adherence post-hoc the p-value was adjusted based on the number of comparisons (Bonferroni adjustment). Dunn’s post hoc analysis was performed for IPAQ score and significant difference was assessed with the help of Benjaminyi-Hochberg False Discovery Rate (FDR) adjusted p-value at <https://astatsa.com/>.

**Result**

The study recruited a total of 413 subjects (Supplementary Table 1). The mean age (SD) of the study sample was 54.34 (13.80) years with maximum participants from the age group upto 45 years (N= 112; 27.12%). The majority of participants were female (211; 51.09%), married (384; 92.98%), lived in urban area (246; 59.56%) and in joint family (339; 82.08%). Furthermore, 55.45% (229) of the population did not take any prophylactic medicine while 44.55% (184) of people took Homeopathic medicine as a prophylactic measure against COVID-19. The most common NCDs found among the study participants were HTN (234; 56.66%) and DM (43; 10.41%) while 14.29% (59) of the participants suffered from more than one NCD.

*Preventive Behavior*

The patients with NCD visiting the OPD followed preventive practices to a larger extent (Supplementary Table 2) like frequent hand washing with soap and water or using alcohol based hand rub (407; 98.55), wearing face masks in public places (410; 99.28%), avoid shaking hands and other contacts with people (411; 99.51%), avoiding public transport (410; 99.28%), avoid spitting in public (409; 99.03%) etc. The subjects were less diligent in cleaning or disinfecting things and surfaces touched by them or others (287, 69.49%). The mean score (SD) of the preventive behavior in the study sample was 60.024 (3.893). Preventive practices were significantly greater among females (*P*= 0.000), unmarried individuals (*P*= 0.024) and persons living in the nuclear family (*P*= 0.000). Interestingly, participants who did not took any prophylactic medicine for COVID-19 were also less diligent in following preventive practices (*P*= 0.000) (Table 1). There was a significant difference in preventive behavior among the demographic groups of education (*P*= 0.000) and occupation (*P*= 0.003). The post-hoc analysis revealed that the subjects with education upto high school (vs junior high school, Q= 4.253, *P*= 0.015), higher secondary (vs junior high school, Q= 5.549, *P*= 0.001), graduate and higher (vs junior high school, Q= 5.626, *P*= 0.001), occupation of government job (vs unemployed, Q= 4.138, *P*= 0.042) and homemaker (vs unemployed, Q= 4.166, *P*= 0.040) showed significantly higher preventive practices (Table 2).

*Medication Adherence*

The NCD patients in the study sometimes forgot to take their medications (72; 17.43%) and in the past two weeks, they did not take their medications on some of the days (84; 20.34%). The subjects sometimes stopped taking medications when they felt that their health condition was under control (64, 15.50%). The majority of subjects (289, 69.98%) did not have any difficulty remembering to take their medications (Supplementary Table 3). Among the study participants, high level of medication adherence was shown by none of the subjects while medium level of adherence was found in 320 (77.48%) and low level of adherence in 93 (22.52%) subjects. A significantly low level of medication adherence was found among unmarried subjects (*χ2*= 11.860, *P*= 0.001). There was a significant difference in medication adherence among the demographic groups of different age categories (*χ2*= 21.919, *P*= 0.000), education (*χ2*= 9.654, *P*= 0.022), occupation (*χ2*= 17.567, *P*= 0.004) and type of NCD ((*χ2*= 80.011, *P*= 0.000) (Table 1). The post-hoc analysis (Table 3) was performed after adjusting the p-value depending on the number of comparisons (Bonferroni adjustment).. It showed that the observed frequency of low medication adherence was significantly higher than expected while the observed frequency of medium medication adherence was significantly lower than expected among participants upto 45 years of age (*P*= 0.000), with education of graduate and higher (*P*= 0.003), who were unemployed (*P*= 0.001), suffering from Chronic Obstructive Pulmonary Disease (COPD)/Asthma (*P*= 0.000) and from other NCDs (*P*= 0.000). Similarly, the observed frequency of low medication adherence was significantly lower than expected while the observed frequency of medium medication adherence was significantly higher than expected among participants suffering from HTN (*P*= 0.000).

*Physical activity*

The analysis of IPAQ score was performed on the sub-sample of 348 subjects as per the scoring guidelines (Table 4). The median (IQR) IPAQ score in the study sub-sample was 536 (510) MET-minutes/week. The level of activity in the participants were categorized into low (146, 41.96%), moderate (191, 54.89%) and high (11, 3.16%). A Mann Whitney test indicated that the median (IQR) IPAQ score for male 693 (530.25) MET-minutes/week and female 462 (363) MET-minutes/week was statistically different (U= 10518, *P*= 0.000). The Kruskal Wallis test showed that there was a statistically significant difference between the IPAQ scores among the demographic group of education (H(3)= 22.304, *P*= 0.000), occupation (H(5)= 27.053, *P*= 0.000) and type of NCD (H(5)= 15.331, *P*= 0.009). A pair wise comparison using post-hoc Dunn's test with Benjaminyi-Hochberg FDR correction (Table 5) indicated that the IPAQ score of education group graduate and higher (median= 678; IQR= 532.5) was observed to be significantly different from those of education upto junior high school (median= 431; IQR= 523.88) (*P*= 0.003), high school (median= 495; IQR= 477.5) (*P*= 0.046) and from the group higher secondary education (median= 462; IQR= 363) (*P*= 0.002). Furthermore, the IPAQ score of occupation of homemaker (median= 400, IQR= 371.25) was observed to be significantly different from business persons (median= 693, IQR= 599.75) (*P*= 0.007), government job (median= 693, IQR= 517.88) (*P*= 0.013) and unemployed (median= 693, IQR= 862.5) (*P*= 0.013).

*Sleeping pattern, smoking/tobacco habit and alcohol intake*

Since the onset of COVID-19 pandemic, the number of hours of sleep was same in 85.23% (352) of the participants as compared to the period before the pandemic while the sleep hours decreased in 11.86% (49) of the participants. There was a significant difference in number of hours of sleep before the pandemic (Mean= 6.697; SD= 1.028) and during the pandemic (Mean= 6.563; SD= 1.321) conditions. (t (412)= 4.134, *P*= 0.000).

Consumption of tobacco products or cigarette was same in 86.68% (358) of the subjects during the pandemic while the consumption decreased in 11.86% (49) as compared to the period before the pandemic. A Wilcoxon signed-rank test determined that there was a statistically significant change (z= 5.090, *P*= 0.000) in tobacco consumption during the pandemic as compared to the period before the pandemic. Similarly, the participants demonstrated significant change (z= 5.119, p= 0.000) in alcohol consumption during the pandemic compared to the period prior to the pandemic. Alcohol consumption was same in 90.80% (375) of the subjects during the pandemic while the consumption decreased in 8.96% (37) of the subjects as compared to the period before the pandemic (Table 6).

**Discussion**

This study explored the preventive behaviour, physical activity and medication adherence among the patients suffering from NCD along with changes in sleep, alcohol and tobacco consumption during COVID-19 pandemic. The prevalence of NCD like HTN (56.66%), DM (10.41%), multimorbidity (14.29%) in present study was similar to findings of other comparable studies [4]. Restriction measures for the pandemic do not imply that all forms of physical activities must be eliminated. Indoor exercises that can be safe, simple, and easily implementable can help in preserving fitness levels while maintaining social distancing. Majority of the participants performed a low (41.96%) or moderate level (54.89%) of physical activity with similar findings in another study from the region on diabetic patients where half of the participants (50%) were physically active, though specific exercises as walking were limited to a small group only (24.07%) [17]. Studies have showed that patients followed some form of exercise (62%) or were regular with their exercise routine (80%) [18,19]. Similar results were found in another study with 61% performing physical activity during the quarantine [20]. The ability of individuals, families and communities to promote health, prevent disease, maintain health, and to cope with illness and disability with or without the support of a health-care provider is of paramount importance in these troubled times [21]. It is imperative to empower individuals as self-carers and caregivers as it might be beneficial in preventing and reducing underlying risk factors, optimizing treatment and managing complications.

Medication adherence is the extent to which a patient acts in accordance with the prescribed interval and dose of a dosing regimen [22]. Globally, it has been reported that full compliance to the treatment for chronic illness is 50%, and this is far less in case of developing countries like India [23] which is again confirmed in this study as high medication adherence was not found in any of the subject with a medium level of medication adherence observed in 77.48% of the subjects. Medication adherence was found increasing with age contrary to other study [24]. In present study the condition with poorest adherence with need for improvement was COPD/Asthma that is consistent with findings of another study [25].

Studies around the globe have reported varying prevalence of non adherence among NCD patients [26,27]. Substance abuse, stress leading to forgetfulness, lack of family and community support, lack of awareness about the complications are some of the major barriers for non adherence to the medications. Important actions needs to be taken by the patient such as self-perception of being healthy and also by the family members through frequent reminders [28].

The preventive behavior displayed by the NCD subjects was remarkable which is consistent with finding of other studies [29,30]. Practice of disinfecting surfaces or things was found wanting among the participants (69.49%) as in similar study from the region [29]. It can be attributed to the fact that some preventive measures are deemed less feasible as they require greater effort (e.g., cleaning frequently touched surfaces) or pose greater difficulties (e.g., staying home) than others.

The COVID-19 pandemic may lead to changes in health behaviors such as smoking, alcohol use and sleep. People may manage social isolation and distress by increasing adverse health behaviors such as smoking or alcohol use. The stress related to quarantine and social isolation could serve as a trigger [31] and an increase in alcohol consumption and alcohol abuse is a matter of growing concern [32]. An increase in alcohol use would add to the usual disease burden associated with alcohol [33] and may weaken the innate and acquired immune system that will add to the COVID-19 load [34]. However, this study reported no change in alcohol drinking in majority of participants (90.79%) during the pandemic similar to other study [35]. Minimal decrease in alcohol intake was observed among very few (7.74%) participants only. Tobacco consumption also remained the same in majority of the participants (90.79%) which are in compliance to other studies [35]. Mean sleep duration was assessed as 6.69 hours prior to the COVID-19 pandemic which meets the guidelines of 7–9 hours for adults [36] and it decreased significantly to 6.56 hours during the pandemic which is in line with findings of other study [37].

There are several strengths of the present study, including the inclusion of multiple health behaviors, a large sample size, and the timing of data collection relative to lockdown restrictions in the region. However, there are also some limitations to consider. Firstly, this was a cross-sectional study assessing the variables on a single observation and no causal relation could be inferred. A follow up study can be undertaken to observe changes over time to assess the impact of changes in social restrictions. Secondly, a convenient sampling method was used for recruiting subjects and therefore the results might have been affected by the cultural norms and may not be generalizable to populations with different characteristics. A larger study may be designed to recruit the participants from diverse cultural backgrounds. Thirdly, the responses may have been subject to recall bias.

The study highlighted the effect of COVID-19 pandemic on lifestyle pattern of patients with NCDs and the burden it placed on health resources. The disruption of services due to enforced restrictions has compounded the problems of NCD patients and forced changes in lifestyle pattern might also generate new long-term disabilities that will add to the NCD burden. It has changed everyday life and lessons should be taken from the experience to build a healthcare system that can protect the most fragile people in our society. A concentrated effort is the need of the hour to create awareness through education campaign and to ensure that NCD patients receive continuous healthcare services. People living with NCDs should be encouraged to monitor their symptoms, practice self-care, adhere to medication, seek healthcare services including counseling, practice physical distancing, wash their hands with soap, and wear masks. To reduce the risk of NCDs, a combination of effective tobacco and alcohol control and health interventions for hypertension, diabetes, and other NCDs should be implemented.

**Conflicts of interest:** There were no conflicts of interest.

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**Table Legends:**

Table 1: Comparison of preventive behavior and medication adherence based on demographic variables (N= 413)

Table 2: Post-hoc test of preventive behavior

Table 3: Post-hoc test of medication adherence

Table 4: Comparison of IPAQ scores based on demographic variables (N= 348)

Table 5: Post-hoc analysis of IPAQ score

Table 6: Comparison of sleep, tobacco consumption and alcohol intake before and during the lockdown

**TABLES**

**Table 1: Comparison of preventive behavior and medication adherence based on demographic variables (N= 413)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Preventive behavior** | | | | **Morisky Medication Adherence** | | | |
| **Low** | **Medium** | **χ² c** | **p-value** |
| **Demographic variables** | | **N** | **%** | **Mean** | **SD** | **ta/Fb** | **p-value** | **n (%)** | **n (%)** |
| Age | Mean age | 54.34 | |  |  |  |  |  |  |  |  |
| Standard Deviation | 13.80 | |  |  |  |  |  |  |  |  |
| Upto 45 years | 112 | 27.12 | 59.741 | 3.671 | 0.437 | 0.727 | 42 (37.50) | 70 (62.50) | 21.919 | 0.000 |
| 46-55 years | 106 | 25.67 | 60.226 | 4.076 | 23 (21.70) | 83 (78.30) |
| 56-65 years | 94 | 22.76 | 59.894 | 3.958 | 14 (14.89) | 80 (85.11) |
| Above 65 years | 101 | 24.46 | 60.248 | 3.907 | 14 (13.86) | 87 (86.14) |
| Gender | Male | 202 | 48.91 | 59.282 | 4.209 | -3.836 | 0.000 | 43 (21.29) | 159 (78.71) | 0.343 | 0.558 |
| Female | 211 | 51.09 | 60.735 | 3.426 | 50 (23.70) | 161 (76.30) |
| Marital status | Married | 384 | 92.98 | 59.938 | 3.962 | -2.355 | 0.024 | 79 (20.57) | 305 (79.43) | 11.860 | 0.001 |
| Unmarried | 29 | 7.02 | 61.172 | 2.606 | 14 (48.28) | 15 (51.72) |
| Type of area | Rural | 167 | 40.44 | 59.599 | 4.227 | -1.783 | 0.076 | 32 (19.16) | 135 (80.84) | 1.810 | 0.178 |
| Urban | 246 | 59.56 | 60.313 | 3.629 | 61 (24.80) | 185 (75.20) |
| Education | Upto junior high school | 70 | 16.95 | 58.257 | 5.177 | 6.397 | 0.000 | 14 (20.00) | 56 (80.00) | 9.654 | 0.022 |
| High school | 99 | 23.97 | 60.051 | 3.629 | 15 (15.15) | 84 (84.85) |
| Higher secondary | 98 | 23.73 | 60.602 | 3.152 | 19 (19.39) | 79 (80.61) |
| Graduate and higher | 146 | 35.35 | 60.466 | 3.582 | 45 (30.82) | 101 (69.18) |
| Occupation | Government job | 59 | 14.29 | 58.898 | 3.310 | 3.644 | 0.003 | 9 (15.25) | 50 (84.75) | 17.567 | 0.004 |
| Private job | 49 | 11.86 | 60.735 | 4.353 | 11 (22.45) | 38 (77.55) |
| Business | 44 | 10.65 | 60.682 | 3.777 | 15 (34.09) | 29 (65.91) |
| Retired | 72 | 17.43 | 60.500 | 3.140 | 11 (15.28) | 61 (84.72) |
| Homemaker/Housewife | 140 | 33.90 | 60.343 | 3.466 | 27 (19.29) | 113 (80.71) |
| Unemployed | 49 | 11.86 | 58.469 | 5.493 | 20 (40.82) | 29 (59.18) |
| Type of family | Nuclear | 74 | 17.92 | 61.419 | 3.476 | 3.721 | 0.000 | 18 (24.32) | 56 (75.68) | 0.169 | 0.681 |
| Joint | 339 | 82.08 | 59.720 | 3.917 | 75 (22.12) | 264 (77.88) |
| Prophylactic medicine | Homoeopathic medicine | 184 | 44.55 | 61.348 | 3.138 | 6.687 | 0.000 | 45 (24.46) | 139 (75.54) | 0.715 | 0.398 |
| I did not took any medicine | 229 | 55.45 | 58.961 | 4.115 | 48 (20.96) | 181 (79.04) |
| Chronic disease | Anxiety/Depression | 18 | 4.36 | 60.556 | 2.975 | 1.881 | 0.097 | 8 (44.44) | 10 (55.56) | 80.011 | 0.000 |
| Diabetes Mellitus | 43 | 10.41 | 58.977 | 4.517 | 6 (13.95) | 37 (86.05) |
| Hypertension | 234 | 56.66 | 59.850 | 3.806 | 34 (14.53) | 200 (85.47) |
| COPD/Asthma | 22 | 5.33 | 61.727 | 2.947 | 18 (81.82) | 4 (18.18) |
| Multi morbidity | 59 | 14.29 | 60.305 | 4.211 | 8 (13.56) | 51 (86.44) |
| Other NCDs | 37 | 8.96 | 60.622 | 3.759 | 19 (51.35) | 18 (48.65) |

N= Number

%= Percentage

SD= Standard Deviation

COPD= Chronic Obstructive Pulmonary Disease

NCD= Non-communicable Disease

a= Two sample t Test

b= Analysis of Variance (ANOVA)

c= Chi square test

p-value< 0.05

**Table 2: Post Hoc Test Of Preventive Behavior**

|  |  |  |  |
| --- | --- | --- | --- |
| **Preventive behavior** | | **Tukey's HSD** | |
|  |  | **q valuea** | **p-value** |
| Education | Upto junior high school vs. high school | 4.253 | 0.015 |
| Upto junior high school vs. higher secondary | 5.549 | 0.001 |
| Upto junior high school vs. graduate and higher | 5.626 | 0.001 |
| Occupation | Government job vs. unemployed | 4.138 | 0.042 |
| Homemaker vs. unemployed | 4.166 | 0.040 |

HSD= Honest Significance Difference

a= Tukey’s HSD q statistics

p-value< 0.05

**Table 3: Post Hoc Test Of Medication Adherence**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Medication adherence** | | **Adjusted standardized residual value** | | **z- value** | **P-value** | **Adjusted p-valuea (Bonferroni Correction)** |
| **Low** | **Moderate** |
| Age | Upto 45 years | 4.446 | -4.446 | -2.734 | 0.000 | 0.006 |
| Education | Graduate and higher | 2.987 | -2.987 | -2.734 | 0.003 | 0.006 |
| Occupation | Unemployed | 3.266 | -3.266 | -2.865 | 0.001 | 0.004 |
| Chronic disease | Hypertension | -4.444 | 4.444 | -2.865 | 0.000 | 0.004 |
| COPD/Asthma | 6.844 | -6.844 | 0.000 |
| Other NCDs | 4.401 | -4.401 | 0.000 |

COPD= Chronic Obstructive Pulmonary Disease

NCD= Non-communicable Disease

a= p-value adjusted for number of comparisons

**Table 4: Comparison Of IPAQ Scores Based On Demographic Variables (N= 348)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **N** | **%** | **IPAQ** | | | |
| **Median** | **IQR** | **Ua/Hb** | **p- value** |
| Age | Upto 45 years | 92 | 26.44 | 495.00 | 517.50 | 2.218 | 0.528 |
| 46-55 years | 92 | 26.44 | 537.50 | 494.25 |
| 56-65 years | 82 | 23.56 | 544.25 | 450.75 |
| Above 65 years | 82 | 23.56 | 516.00 | 479.63 |
| Gender | Male | 175 | 50.29 | 693 | 530.25 | 10518 | 0.000 |
| Female | 173 | 49.71 | 462 | 363 |
| Marital status | Married | 322 | 92.53 | 521.75 | 480 | 3798 | 0.215 |
| Unmarried | 26 | 7.47 | 619 | 554.13 |
| Type of area | Rural | 140 | 40.23 | 516 | 510 | 14499 | 0.473 |
| Urban | 208 | 59.77 | 536 | 508.5 |
| Education | Upto junior high school | 52 | 14.94 | 431 | 523.88 | 22.304 | 0.000 |
| High school | 82 | 23.56 | 495 | 477.5 |
| Higher secondary | 83 | 23.85 | 462 | 363 |
| Graduate and higher | 131 | 37.64 | 678 | 532.5 |
| Occupation | Business | 55 | 15.80 | 693 | 599.75 | 27.053 | 0.000 |
| Government job | 42 | 12.07 | 693 | 517.88 |
| Private job | 35 | 10.06 | 626.5 | 344 |
| Retired | 65 | 18.68 | 594 | 252 |
| Homemaker/Housewife | 111 | 31.90 | 400 | 371.25 |
| Unemployed | 40 | 11.49 | 693 | 862.5 |
| Type of family | Nuclear | 54 | 15.52 | 495 | 307.13 | 7932 | 0.496 |
| Joint | 294 | 84.48 | 537 | 510 |
| Prophylactic medicine | Homoeopathic medicine | 155 | 44.54 | 527.5 | 338 | 14242 | 0.221 |
| I did not took any medicine | 193 | 55.46 | 537 | 517.5 |
| Chronic disease | Anxiety/Depression | 14 | 4.02 | 550.25 | 456.63 | 15.331 | 0.009 |
| Diabetes Mellitus | 36 | 10.34 | 717.75 | 1046.25 |
| Hypertension | 194 | 55.75 | 496 | 366 |
| COPD/Asthma | 19 | 5.46 | 360 | 693.75 |
| Multi morbidity | 50 | 14.37 | 675 | 514.88 |
| Other NCDs | 35 | 10.06 | 462 | 516.5 |

IPAQ= International Physical Activity Questionnaire (Short Form)

N= Number

%= Percentage

IQR= Inter Quartile Range

COPD= Chronic Obstructive Pulmonary Disease

NCD= Non-communicable Disease

a= Mann Whitney U Test

b= Kruskal Wallis H Test

p-value< 0.05

**Table 5: Post Hoc Analysis Of IPAQ Score**

|  |  |  |  |
| --- | --- | --- | --- |
| **Demographic variable** | | **DUNN TEST** | |
| **Unadjusted p-value for the paired comparison** | **Benjaminyi-Hochberg FDR adjusted p-value** |
| Education | Upto junior high school vs graduate and higher | 0.001 | 0.003 |
| High school vs graduate and higher | 0.023 | 0.046 |
| Higher secondary vs graduate and higher | 0.000 | 0.002 |
| Occupation | Business vs homemaker | 0.001 | 0.007 |
| Government job vs homemaker | 0.002 | 0.013 |
| Homemaker vs unemployed | 0.002 | 0.013 |

IPAQ= International Physical Activity Questionnaire (Short Form)

FDR= False Discovery Rate

p-value< 0.05

**Table 6: Comparison of Sleep, Tobacco Consumption And Alcohol Intake Before And During The Lockdown**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Sleep** | | | | **Tobacco consumption** | | | | **Alcohol consumption** | | | |
| **N** | | **%** | | **N** | | **%** | | **N** | | **%** | |
| Increased during COVID-19 | 12 | | 2.91 | | 6 | | 1.45 | | 1 | | 0.24 | |
| Same as before | 352 | | 85.23 | | 358 | | 86.68 | | 375 | | 90.80 | |
| Decreased during COVID-19 | 49 | | 11.86 | | 49 | | 11.86 | | 37 | | 8.96 | |
|  | **Mean** | **SD** | **Ta** | **p-value** | **Mean** | **SD** | **zb** | **p-value** | **Mean** | **SD** | **z** | **p-value** |
| Before COVID-19 pandemic | 6.697 | 1.028 | 4.134 | 0.000 | 770 | 119.352 | 5.090 | 0.000 | 370.5 | 68.955 | 5.119 | 0.000 |
| During COVID-19 pandemic | 6.563 | 1.321 |

N= Number

%= Percentage

COVID-19= Coronavirus Disease 2019

SD= Standard Deviation

a= Paired t Test

b= Wilcoxon Signed Rank Test z value

p-value< 0.05