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# Evaluation of factors for medication non-adherence in chronic diseases and its association with the level of stress in health care providers in a tertiary care hospital- A cross sectional observational study

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## ABSTRACT:

***Background:*** *Therapeutic regimen effectiveness highly depends on medication adherence. Poor medication adherence resulting in therapeutic failure is seen in healthcare providers (HCPs). Literature reviews focusing exclusively on the illness experiences of HCPs are lacking; hence, they need to be evaluated.*

***Methodology:*** *A cross-sectional study among HCPs having one chronic disease, lasting 1year, and taking one chronic medication was conducted after ethics approval. An online questionnaire comprising an e-consent form, inclusion criteria, demographic characteristics, factors affecting adherence, Adherence to Refills and Medication-Scale (ARMS), Perceived Stress-Scale (PSS), and Brief-Illness Perception Questionnaire (BPIQ) was used. Data was analysed by applying chi-square and binary logistic regression using SPSS version 24.*

***Results:*** *About 207 participants took up the study, and 52 (25.1%) were excluded. Of 155 (74.9%) continued, age group 46-55 (42.6%), female (81.3%), married (81.3%), having Master's degree (72%) with regular employment (71%), medium income (81.3%), non-smokers (82.6%), having disease-duration>3yrs (71%), 1-chronic-disease (77.4%), 1-chronic-medication (66.8%) and no health insurance (64.5%). Forgetfulness (49.7%), Anxiety (21.2%), busy lifestyle was observed (49.7%), mild disease (43.9%), treatment complexities (42.6%), indirect costs (15.5%), and concern at workplace (60%) were the important factors for non-adherence to medication. ARMS showed 93.4% adherence to medications. Among adherents, 62% had moderate stress and 13% showed high stress. Among non-adherent, 100% showed moderate stress. BPI reflected that 69% participants had a positive perception of the disease, and had moderate stress (76.6%). A statistically significant but weak positive correlation between stress score and perception about the disease was observed.*

***Conclusions:*** *Study results showed forgetfulness, busy lifestyle, treatment complexities, side effects of medications, and negative perceptions of illness had led to non-compliance in HCPs. A significant association between factors for non-adherence and stress was observed. A weak positive correlation was seen between adherence, perception of illness, and stress.*

## KEYWORDS:

***Adherence to Refills and Medication Scale"; "Brief Illness Perception Questionnaire"; "Medication Adherence"; "Perceived Stress Scale"; "Therapeutic Failure.***

## 1. Introduction

It is a well-known quote in Western medicine that doctors should always be healthy, as their illness experiences constantly influence not only their perceptions of illness and roles, but also their medical practice. But as no one is free from disease, health care providers(HCPs) also have to behave as patients when they encounter one of the chronic diseases. It is also as important for them to adhere to their medications as it is for the patients they treat. Medication-adherence, therefore, refers to the degree to which a patient correctly takes and adheres to their prescription regimen as directed by their physician [1].

Non-adherence to medications in HCPs can be a result of improper training during their medical

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education to deal with their own illness. This may indirectly have an adverse impact on the health outcomes, cost-effectiveness of medical care, psychological, social, and physical well-being of HCPs as well [2-5]. It is important that, as patients adhere to medications, prescribers also adhere to medications when prescribed to them. It is shown in previous studies that doctors' disease prognoses are mostly better than or similar to those of patients belonging to the general population [6].

Adherence to medication is essential because it enhances quality of life by managing both transient and chronic diseases. The World Health Organization (2003) reported that the adherence rate to long-term therapies in developed countries was 50% [7]. Studies showed that half the patients are considered non-adherent to their chronic medications. As medication adherence is a dynamic process, a number of elements are identified that can cause hurdles to it. Many techniques to detect non-adherence have been proposed in the literature over the past few decades, but only a small number of them have been proven to be effective [8]. The Morisky Medication-Adherence Scale8-items(MMAS-8) [9] and the Adherence to Refills and Medications Scale 12-items(ARMS) [10] are the most widely utilized, valid, and accurate questionnaires to detect non-adherence.

Factors associated with medication non-adherence in HCPs need to be evaluated, and have not been done in the past. Factors like mental-health conditions, most commonly depression and Anxiety, as well as inadequate health-related information, are correlated to patient non-adherence to medicines [11]. Despite awareness of their illness and the importance of adherence, healthcare providers' limited time for personal health management may contribute to suboptimal adherence behaviors. Despite awareness of their illness and the importance of adherence, healthcare providers' limited time for personal health management may contribute to suboptimal adherence behaviors. It is suggested that age, race, anxiety, depression, and perceived social support influence compliance in chronic illnesses. Depression's role and how anxiety and stress alter the management of chronic disease-related parameters are still not clear [12]. Moreover, the majority of prior research has ignored the social and historical predispositions of physicians as well as their biomedical viewpoints of their own ailments. Importance of taking their medications on time without missing them, even under undue work-related pressure, is a crucial step towards the management of chronic diseases. Job-related travels and job conditions may also contribute as stress factors that can lead to non-compliance [13]. Social issues like job security, concerns, and environmental stress in the workplace could also be factors for non-adherence [14].

Perceived Stress Scale (PSS) is one of the classical tools for assessing stress [15] and is widely used to help comprehend how various circumstances impact emotions and perception of stress. This scale measures the thoughts and feelings that a person has throughout the past month.

Illness perceptions play a significant role in determining health behaviors (treatment adherence), and thus influence outcomes like quality of life, functional recovery, and clinical parameters. BIPQ is a valid and dependable metric [16] to evaluate the influence of illness on emotion and cognition

There is a scarcity of studies regarding the behavior of HCPs in relation to medication adherence when they are suffering from one or more chronic diseases. Limited studies are available that analysed whether stress due to their work affects their adherence to their prescribed medications. Hence, a study was conducted to assess factors responsible for the medication non-adherence in HCPs and to determine its relationship with job-related stress in a tertiary care hospital.

*Objectives*:

To evaluate factors affecting medication non-adherence and their association with the level of stress in HCPs, and secondarily to study HCPs' attitude towards adherence to medication using the "Adherence to Refills and Medication Scale 12-items" scale, analyze stress scores in HCPs using the "Perceived Stress Scale", and to assess perception of HCPs towards their Illness using the "Brief Illness Perception Questionnaire"

## 2. MATERIALS AND METHODS:

*Subjects and Methods*:

A cross-sectional questionnaire-based study was conducted after taking institutional ethics committee permission (ESICMC/SNR/IEC-F653/09/2024) between November 2024

and January 2025. The Declaration of Helsinki Guidelines were followed. HCPs at a tertiary-care hospital participated in the study. They were requested to fill in the questionnaire sent through Google Forms after taking informed consent. HCPs between 26 -70 years, both genders, and having at least one chronic disease (disease lasting 1year or more, limiting daily activities and taking one or more medications) were included, and HCPs having an episodic nature of disease for a duration of less than a year were excluded.

Section 1 in the questionnaire included demographic characteristics and factors affecting medication non-adherence in HCPs. Section 2 comprised the Adherence to Refills and Medication Scale-12-items (ARMS). An ARMS is a validated instrument to measure patients' adherence, especially in chronic diseases, and consists of 12 items, each including a 4-point scale. The scale ranges from "None of the times", rated as "1", to "All of the times", rated as "4", making the total score range from 12-48, and the 12th item is reverse-coded. It measures participants' adherence to taking medications (8items) and adherence to refilling prescriptions (4items). The score of 12will be considered as a cut-off point value, and all participants with a score of 12will be taken as having high-adherence, while those with a score >12 will be rated as having low-adherence to medications.

Section 3 measured the perceived work-related stress, a well-tested stress-assessment instrument. Scores for questions 4, 5, 7, and 8 are reversed like 0=4, 1=3, 2=2, 3=1, 4=0. PSS scores can range from 0 to 40. Scores from 27-40 indicate higher-stress, 0-13 low-stress, and 14-26 moderate-stress.

Section 4 included BIPQ, having 8items (cognitive illness assessing consequences, timeline, personal control, treatment control, and identity (5items); emotional representations assessing concern and emotions (2items); and illness comprehensibility (1item). An open-ended response item asking participants to list three 3most likely factors in having roles in their illness was included. Each item is scored on a 0-10 ordinal scale, making the total score from 0 to 80. Scores nearing 80 would indicate a higher negative illness perception of the disease.

### *Statistical Methods:*

A sample size of 176 was considered sufficient to detect a 50%frequency of the outcome factor in the population of 500, with confidence limits of 90%. Considering a 20%non-response rate, a total sample of 220 has to be studied.

Sample-size $\boldsymbol{n = [DEFF*Np(1-p)]/[(d^2/Z^2_{1-\alpha/2}*(N-1)+p*(1-p)]}$

Design-effect (DEFF) for cluster surveys-1

## 3. Data Analysis:

IBM-SPSS version 24.0, Armonk, NY: IBM Corp., was used to analyze the data. Categorical variables were presented as frequencies and percentages. The relationship between stress levels and socio-demographic characteristics, and risk factors was evaluated using the Chi-square test as the data was non-normal (Shapiro–Wilk test), the correlation among stress-scores and adherence and BIPQ was analysed using Spearman's correlation-coefficient test. $P<0.05$ was considered statistically significant.

## 4. RESULTS:

Out of 207participants, 155 had 1chronic disease and were on 1or more medications for a duration of 1 or more years. About 74.9% of them participated. (Figure 1) Participants were higher in age-group 46-55 years, mostly females and married, with an MD degree, regular employment, non-smokers, having a medium income, and few having health insurance. (Table 1)

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**Figure 1: Study Flow Diagram**

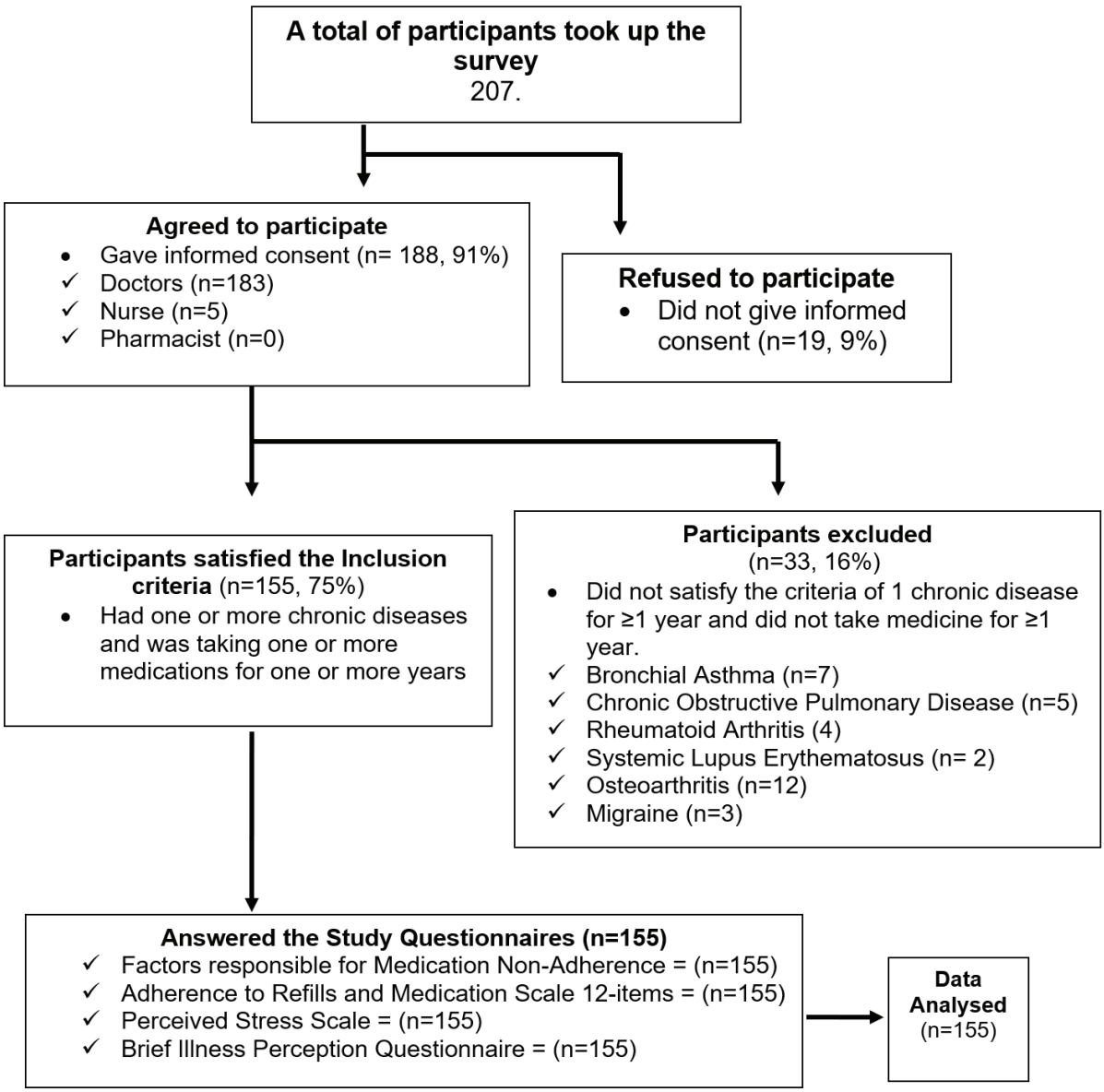


**Table 1: Demographic Characteristics of Participants**

| Variable | Category | Frequency (n=155) | Percentage (%) |
|---|---|---|---|
| Age | 26-35 | 22 | 14.2 |
| | 36-45 | 33 | 21.3 |
| | 46-55 | 66 | 42.6 |
| | 56-65 | 30 | 19.4 |
| | 66-70 | 4 | 2.6 |
| Gender | Males | 29 | 18.7 |
| | Females | 126 | 81.3 |
| Marital status | Single | 26 | 16.7 |
| | Married | 129 | 83.2 |
| | Divorced/ widowed | --- | --- |
| Educational status | MBBS | 22 | 14.2 |
| | MD/MS/DNB | 113 | 72.9 |
| | DM/MCh/ DrNB | 15 | 9.7 |
| | BSc/ MSc Nursing | 5 | 3.2 |
| | Bpharm/ MPharm | --- | --- |
| Employment status | Regular | 110 | 71 |
| | Contract | 45 | 29 |
| Income rate | Low | --- | --- |
| | Medium | 126 | 81.3 |
| | High | 29 | 18.7 |
| Smoking status | Smoker | 27 | 17.4 |
| | Non-smoker | 128 | 82.6 |

The majority had >3years of disease duration, one chronic disease, and were on a single chronic medication. The disease characteristics included 74.4% Type-2 DM, 48% dyslipidemia, 82.2% hypertension, and 26.4% hypothyroidism, respectively. (Table 2)

**Table 2: Disease Characteristics of Participants**

| Variable | Category | Frequency (n=155) | Percentage (%) |
|---|---|---|---|
| Duration of disease, years | 1 year | 32 | 20.6 |
| | 2years | 13 | 8.4 |
| | ≥3years | 110 | 71 |
| Number of Chronic Diseases | 1 | 120 | 77.4 |
| | 2 | 21 | 13.5 |
| | ≥ 3 | 14 | 9.1 |
| Number of Chronic Medications | 1 | 102 | 65.8 |
| | 2 | 27 | 17.4 |
| | ≥ 3 | 26 | 16.8 |
| Medication Insurance | Yes | 55 | 35.5 |
| | No | 100 | 64.5 |
| Major Types of Chronic Disease | Hyper-tension | 53 | 82.2 |
| | Type 2 Diabetes M | 48 | 74.4 |
| | Dyslipid-emia | 31 | 48 |
| | Hypothy-roidism | 17 | 26.4 |

## Association of Level of Stress (Low, Moderate, and High) with Participant Characteristics

The present study demonstrates that age and stress levels are significantly associated ($p < 0.001$*). Most participants with high stress were between the ages of 26 and 35 years, followed by the age group of 46- 55 years. Stress levels were lower among participants aged 56–70years. Gender did not show a statistically-significant correlation with stress level ($p=0.156$), even though a higher percentage of males reported lower stress than women. There was a significant association between stress levels and marital status ($p < 0.001$*). Stress levels were higher among single people than among married people. There was a substantial association ($p < 0.001$*) between stress and educational status. Participants with DM/MCh qualifications reported mild stress. However, a significantly higher proportion of those with either MBBS or MD/MS experienced severe stress, respectively. There was a significant correlation between stress levels and work status ($p=0.026$*). Contractual workers showed higher levels of stress than regular employees. Patients who had been ill for two years experienced very little stress, whereas those who had been ill for three or more years experienced more stress. Longer illness-duration could also be the reason for non-adherence and may be associated with higher stress levels ($p=<0.001$*). All participants with at least five drugs experienced moderate stress (neither low nor high). Stress levels were higher among participants who were taking four or more drugs ($p < 0.001$*), indicating that polypharmacy may play a significant role in stress. Lower stress was reported by insured individuals compared to uninsured individuals. (Table: 3)

**Table 3: Association of Level of Stress with Participant Characteristics**

| Age range | Level of Stress | | | Total (n=155, %) | P value |
|---|---|---|---|---|---|
| | Low Stress (n,%) | Moderate Stress (n, %) | High Stress (n, %) | | |
| 26-35 | 1(4.5) | 9 (40.9) | 12 (54.6) | 22 (14.2) | <0.001*** |
| 36-45 | 6 (18.2) | 27 (81.8) | 0 | 33 (21.2) | |
| 46-55 | 18 (27.3) | 47 (71.2) | 1 (1.5) | 66 (42.5) | |
| 56-65 | 17 (56.7) | 13 (43.3) | 0 | 30 (19.5) | |
| 65-70 | 0 | 4 (100) | 0 | 4 (2.6) | |
| **Gender** | | | | | 0.156 |
| Male | 10 (34.5) | 19 (65.5) | 0 | 29 (18.7) | |
| Female | 32 (25.4) | 81 (64.3) | 13 (10.3) | 126 (81.3) | |

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| | | | | | |
|---|---|---|---|---|---|
| **Marital Status** | | | | | |
| Single | 6 (23.1) | 12 (46.2) | 8 (30.7) | 26 (16.8) | <0.001*** |
| Married | 36 (27.9) | 88 (68.3) | 5 (3.8) | 129 (83.2) | |
| **Educational status** | | | | | |
| MBBS | 1(4.5) | 17 (77.3) | 4(18.2) | 22 (14.2) | <0.001*** |
| MD, MS | 27 (23.9) | 77 (68.1) | 9 (8) | 113 (72.9) | |
| DM, MCh | 14 (93.3) | 1 (6.7) | 0 | 15 (9.7) | |
| Nursing | 0 | 5 (100) | 0 | 5 (3.2) | |
| **Employment Status** | | | | | |
| Regular | 31(28.2) | 74 (67.3) | 5 (4.5) | 110 (70.9) | 0 .026* |
| Contract | 11 (24.4) | 26 (57.8) | 8 (17.8) | 45(29.1) | |
| **Smoking** | | | | | |
| Yes | 5 (18.5) | 22 (81.5) | 0 | 27 (17.4) | 0.079 |
| No | 37 (28.9) | 78 (60.9) | 13 (10.2) | 128 (82.6) | |
| **Income Rate** | | | | | |
| Medium | 38 (30.2) | 76 (60.3) | 12 (9.5) | 126 (81.3) | 0.074 |
| High | 4 (13.8) | 24 (82.8) | 1 (3.4) | 29 (18.7) | |
| **Duration of chronic disease** | | | | | |
| 1year | 12 (37.5) | 20 (62.5) | 0 | 32 (20.6) | <0.001*** |
| 2 years | 11 (84.6) | 2 (15.4) | 0 | 13 (8.4) | |
| ≥3 years | 19 (17.3) | 78 (70.9) | 13 (11.8) | 110 (71) | |
| **No. of chronic diseases** | | | | | |
| 1 | 32 (26.7) | 75 (62.5) | 13 (10.8) | 120 (77.5) | 0.310 |
| 2 | 5 (23.8) | 16 (76.2) | 0 | 21 (13.5) | |
| ≥ 3 | 5 (35.7) | 9 (64.3) | 0 | 14 (9) | |
| **Number of medications** | | | | | |
| 1 | 25 (24.5) | 68 (66.7) | 9 (8.8) | 102 (65.8) | <0.001*** |
| 2 | 9 (33.3) | 18 (66.7) | 0 | 27 (17.4) | |
| 3 | 5 (35.7) | 9 (64.3) | 0 | 14 (9.1) | |
| 4 | 3 (42.9) | 4 (57.1) | 0 | 7 (4.5) | |
| ≥5 | 0 | 1(20) | 4(80) | 5 (3.2) | |
| **Medical Insurance** | | | | | |
| Yes | 1 (1.8) | 53 (96.4) | 1(1.8) | 55 (35.5) | <0.001*** |
| No | 41(41) | 47 (47) | 12 (12) | 100 (64.5) | |

*Data comparisons were done by the Kruskal-Wallis Test, and the association was determined by the Chi-Square test*

**** Highly significant, p<0.001*

**Association of the Level of Stress with Factors Responsible for Medication Non-Adherence**

Numerous non-adherent factors, such as forgetfulness (*p<0.001**), psychological factors like anxiety (*p=<0.001**), behavioral habits like being too busy (*p=0.006*), disease-related factors like stage and severity (*p=0.000*), therapy-related factors like treatment complexity (*p=<0.001**), socioeconomic factors like indirect treatment costs (*p=<0.001**), and social issues like workplace stress and concerns (*p=0.006*), are statistically significantly correlated with stress-levels. (Table: 5)

**Table 5: Association between Factors Responsible for Medication Non-Adherence and Level of Stress**

| | Level of Stress | | | Total (n=155, %) | P value |
|---|---|---|---|---|---|
| | Low Stress (n,%) | Moderate Stress (n,%) | High Stress (n,%) | | |
| **Cognitive factors** | | | | | |
| Bad Previous experience | 5 (35.7) | 9 (64.3) | 0 | 14 (9) | 0.001*** |
| Religious beliefs' | 0 | 10 (100) | 0 | 10 (6.5) | |
| Forgetfulness | 16 (20.7) | 48 (62.3) | 13 (16.8) | 77 (49.7) | |
| None of the above | 21 (38.9) | 33(61.1) | 0 | 54 (34.8) | |
| **Psychological factors** | | | | | |
| Fear | 6 (31.5) | 12 (63.2) | 1 (5.3) | 19 (12.3) | <0.001*** |
| Obsession | 0 | 4 (100) | 0 | 4 (2.6) | |
| Anxiety | 9 (27.3) | 12 (36.4) | 12 (36.4) | 33 (21.2) | |
| None of the above | 27 (27.3) | 72 (72.7) | 0 | 99 (63.9) | |
| **Behavioral factors** | | | | | |
| Behavioural habits | 9 (45) | 7 (35) | 4 (20) | 20 (12.9) | 0.006 ** |
| Lifestyle too busy | 16 (20.8) | 52 (67.5) | 9 (11.7) | 77 (49.7) | |
| None of the above | 17 (32.1) | 36 (67.9) | 0 | 53 (34.2) | |
| Anxiety | 0 | 5 (100) | 0 | 5 (3.2) | |
| **Disease-related factors** | | | | | |
| Type of disease | 34 (50) | 26 (38.2) | 8 (11.8) | 68 (43.9) | <0.001*** |
| Disease stage, severity | 1 (3.7) | 26 (96.3) | 0 | 27 (17.4) | |
| None of the above | 7 (11.7) | 48 (80) | 5 (8.3) | 60 (38.7) | |
| **Therapy-related factors** | | | | | |
| Treatment complexity | 21 (31.8) | 32 (48.5) | 13 (19.7) | 66 (42.6) | <0.001*** |
| Treatment Duration | 12 (40) | 18 (60) | 0 | 30 (19.4) | |
| Medication Side Effects | 9 (15.3) | 50 (84.7) | 0 | 59 (38) | |
| **Socioeconomic Factors** | | | | | |
| Direct cost of treatment | 0 | 8 (50) | 8 (50) | 16 (10.3) | <0.001*** |
| Indirect cost of treatment | 4 (16.7) | 20 (83.3) | 0 | 24 (15.5) | |
| None of the above | 38 (33.1) | 72 (62.6) | 5 (4.3) | 115 (74) | |
| **Social issues** | | | | | |
| Concerns about workplace stress | 26 (28) | 54 (58.1) | 13 (13.9) | 93 (60) | 0.006** |
| None of the above | 16 (25.8) | 46 (74.2) | 0 | 62 (40) | |

*Data comparisons were done by the Kruskal-Wallis test, and association by the Chi-Square test*
**** Highly significant, p<0.001*

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**Association of Level of Stress to Medication Adherence and Brief Illness Perception**

Participants were classified as "adherent" or "non-adherent" to their medicine based on their ARMS score, and their level of stress was separated into three categories: low, moderate, and high. To evaluate the relationship between participants' stress levels and medication adherence (ARMS Score), a cross-tabulation was conducted. Out of the 155, 10participants did not take their medications as prescribed, whereas 145 did. Interestingly, none of the non-adherent participants fell into the low or high stress categories, whereas 100% reported moderate stress. Of the adherent individuals, 90 (62.1%) indicated moderate stress, 13 (9%) reported high stress, and 42 (28.9%) reported low stress. Stress-score and ARMS-score showed weak positive correlation (Spearman's rho=0.066; *p=0.414*), which was non-significant, indicating that as stress increases, ARMS-score slightly increases. (Table: 5)

Table 6 also shows the distribution of participants with positive vs. negative illness perceptions across three stress levels (low, moderate, and high), wherein 76.6% with a positive perception reported moderate stress, whereas 25% of those with a negative perception of illness reported higher stress. There is a weak but statistically significant positive correlation between stress score and Brief Illness Perception score. Individuals with more negative illness perceptions tend to experience slightly higher stress levels (Spearman's rho=0.220; *p=0.006*). (Table: 6)

**Table 6: Correlation of Medication Adherence and Brief Illness Perception to Level of Stress**

| ARMS | Perceived Stress Scale (PSS) (n,%) | | | Total (n,%) | Spearman's rho | P value | Remarks |
|---|---|---|---|---|---|---|---|
| | Low Stress | Moderate Stress | High Stress | | | | |
| Medication Adherence | 42 (29) | 90 (62) | 13(8.9) | 145 (93.5) | 0.066 | 0.414 | Weak positive but non-significant correlation |
| Medication Non-Adherence | -- | 10 (100) | -- | 10 (6.4%) | | | |
| **BIPQ** | | | | | | | |
| Positive Perception of the disease | 24 (22.4) | 82 (76.6) | 1 (0.9) | 107 (69) | 0.220 | 0.006** | Weak positive but significant correlation |
| Negative Perception of the disease | 18 (37.5) | 18 (37.5) | 12 (25) | 48 (31) | | | |

*Data analyzed by Spearman's correlation coefficient test* *** = p<0.001*

ARMS - Adherence to Refills and Medication-Scale, PSS - Perceived Stress Scale, BIPQ - Brief Illness Perception Questionnaire

A weak positive correlation between stress score and Perception of disease existed, indicating that as the negative illness-perception score increases, the stress score also increases slightly, and the association is statistically significant.

## 5. DISCUSSION:

Study results showed that participants' socio-demographic factors, gender, smoking status, income rate, and number of chronic diseases did not show any association with stress. Forgetfulness, busy lifestyle, severity of disease, treatment complexities, and concerns at the workplace were the most common factors responsible for non-adherence to medications ($p<0.05$). The majority of participants were adherent to medications, showed moderate stress, and had a positive perception of illness.

Stress is known to contribute to treatment non-adherence, and the socio-demographic factors also influence medication-adherence behaviour[14]. Participants experiencing higher stress had 4.2 times the likelihood of non-adherence compared to those experiencing moderate stress (AOR=4.2, 95%CI: 1.7–10.3; *p=0.002**). Furthermore, non-adherence and moderate stress were significantly correlated (*p=0.036**).

The present study showed a higher non-response rate, as most of the participants did not provide informed consent and failed to meet the predetermined inclusion criteria; thus, a comparatively high exclusion rate of 25.1% was noted. Questionnaire-based studies frequently had to exclude participants due to response fatigue, confidentiality concerns, or time constraints. This is particularly true for studies that focus on sensitive behavioral domains like medication adherence. Furthermore, because those who are less engaged or take their prescriptions less frequently may be less inclined to participate, voluntary participation inevitably carries the potential of non-response bias [17]. To guarantee data quality, dependability, and compliance with ethical research requirements, these responses have to be excluded. However, this exclusion should be taken into account when extrapolating the results because it can reduce the final sample's representativeness and may lead to selection bias.

This study highlighted the predominance of female health care participants in the middle-aged group. It is in contrast to data collected by Karan et al. (2021) [18], which show that while women exceed men in the nurse category, there is a definite numerical superiority of men in the doctor, dentist, and AYUSH categories. The majority of doctors' employment is in the private sector, where physicians are more concentrated in the 50+ age range (18%) than dentists (3%), and nurses (5.5%) are in the same age group. Due to time/access constraints, denial of vulnerability, and masculinity standards, men may be less likely to participate in health surveys and devote time to self-care, which could explain the higher proportion of female participants in the current study. Because male physicians responded less frequently, there is a chance that gender response bias will occur, making physician/HCP surveys less representative.

One significant finding was that HCPs in the younger age group showed higher stress and were negligent about their prescription of medicines. The tendency towards higher non-adherence in younger patients raises the possibility of a generational difference in health attitudes or lifestyle-related restrictions, even if age did not achieve statistical significance ($p=0.082$). According to earlier research (Jimmy & Jose,2011) [19], younger persons frequently put less importance on managing chronic illnesses because they feel invincible or have other obligations. Non-adherence was significantly predicted by being unmarried ($p=0.016$) and working under contract ($p=0.025$). These results are consistent with those of (Gast and Mathes, 2019) [20], who found that poor adherence in populations with chronic illnesses is influenced by social isolation and erratic income sources.

Higher non-adherence was also predicted by level of educational attainment (e.g., MBBS vs. DM/MCh) ($p=0.048$), indicating that medication-taking habits may be influenced by health literacy and perceived treatment value. A patient's educational background frequently influences their comprehension of prescription instructions and the long-term advantages of following those (Unni & Farris, 2011) [21]. These findings therefore imply that healthcare personnel, who are younger, unmarried, less experienced (MBBS), or employed on a contract basis, may be more vulnerable to non-adherence because of greater stress levels. Focused interventions like stress management training, job security, and counselling should be considered to support these groups.

Stress levels were considerably higher among patients without health insurance, those prescribed more than three medications, and those with chronic diseases that persisted longer than three years. Polypharmacy and lack of insurance also turned out to be important factors. These results are in line with past studies (Gast & Mathes, 2019) 20]; DiMatteo, 2004) [22] that highlight regimen complexity and financial load as the main obstacles to adherence. Direct and indirect financial stress exacerbates psychological strain, leading to a vicious cycle of non-adherence and declining health outcomes.

The present study, in addition, demonstrates a significant association between stress levels and multiple factors contributing to medication non-adherence, encompassing cognitive, psychological, behavioral, and disease-related domains. Forgetfulness among cognitive characteristics was observed as a significant factor associated with elevated stress levels. This result is consistent with earlier studies (Jimmy & Jose, 2011) [19] showing that the effect on memory and focus could be associated with stress, resulting in inadvertent non-adherence. Furthermore, religious beliefs were also substantially linked to higher levels of stress. Sometimes, especially when under psychological pressure, patients with strong spiritual or religious beliefs may choose faith-based healing over medications (Kretchy *et al*., 2013) [23].

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Poor medication adherence and higher stress were also closely associated with psychological factors, especially anxiety. This is in line with meta-analytic data (Grenarde *et al*., 2011) [24] that indicate psychological distress, such as depression and anxiety, seriously impairs a patient's capacity to stick to treatment plans. Distress like this can make people less motivated, apathetic, or less confident in their ability to manage a chronic condition (DiMatteo, 2004) [22]. Patients who reported a busy lifestyle or time restrictions were more likely to suffer stress and therefore not comply with their treatment plans, according to behavioral factors. This confirms the results of (Unni and Farris, 2011) [21], who found that the main obstacles to regular medication use were conflicting priorities and lifestyle burden.

There was a substantial correlation found between stress levels and the therapy-related factors that influence non-adherence. If HCPs had negative side effects from their drugs or thought their treatment was challenging, they were more likely to report moderate to higher stress. Side effects and treatment complexity significantly increase stress, potentially leading to non-adherence. There is no pattern of increased stress with longer treatment duration. Higher stress levels were also strongly associated with higher treatment costs, both directly and indirectly.

These findings suggest that stress-linked non-adherence is significantly influenced by financial strain and therapy-related difficulties (Gast & Mathes, 2019) [20]; DiMatteo, 2004) [20]. This is consistent with past research (Jimmy & Jose, 2011) [19] that indicates adverse drug reactions and complex prescription schedules greatly hinder adherence by increasing treatment burden and patient pain. Furthermore, a robust relationship was observed between higher stress and both direct (cost of medications) and indirect (travel and lost pay) financial burden ($p < 0.001$*). According to (Gast & Mathes, 2019 [20]; Park & Iacocca, 2014) [25], financial limitations are one of the most reliable indicators of medication non-adherence, especially for patients with chronic conditions. The protective function of financial security in medication-taking behavior was further supported by the low stress levels of patients who reported no financial difficulties.

Non-adherence was substantially correlated with stress from social and professional demands ($p=0.006$). Environmental stressors, including social and professional obligations, may lead to higher stress levels and may make it difficult to adhere to a plan. Those who reported no such stresses did not experience any high-stress situations, suggesting a strong protective function. According to Unni and Farris (2011) [21], burnout at work or a lack of social support might impair a patient's capacity to prioritize health-related behaviors. There was no correlation between ARMS score and stress score as per the study results. This gradient raises the possibility of a threshold effect, in which low stress is not disruptive, but mild to moderate stress may hinder self-care practices. Hence, the notion that stress acts as a trigger and a modulator in the adherence pathway is supported by these findings (Grenarde *et al*., 2011) [24].

The brief Illness Perception score and the stress score have a weak but statistically significant positive association. This suggests that people who perceive disease more negatively may be associated with slightly greater stress levels. The high correlation between stress and the sense of disease, as determined by the BIPQ, is a convincing conclusion. Stress levels were noticeably greater among patients who had pessimistic, fearful, or hopeless views about their disease. This supports the theory put forward by Park and Iacocca (2014) [25], according to which emotional reactions and coping mechanisms, such as adherence, are mediated by cognitive assessment of illness. Therefore, encouraging a more optimistic and controllable perspective related to disease could be a crucial intervention strategy for lowering stress and enhancing adherence.

### *Study limitations and strengths:*

Very few qualitative studies, to the best of our knowledge, were undertaken to record compliance of HCPs with their own prescription orders or with prescriptions by other specialists. It highlighted that the medical fraternity, in spite of being aware of the consequences of medication non-adherence, shows reluctance to adhere due to various factors that can be corrected by their own expertise. The study has given an insight into how younger HCPs are experiencing a higher level of stress. It may possibly be linked to an imbalance between their disease and health status due to inadequate psychological and financial support extended by the organizations.

The present study had a few major limitations related to the generalization of the results,

considering the qualitative nature of the study. This study was designed to explore HCPs' perspectives on the factors affecting the adherence and non-adherence of medications of their self-therapeutic orders and to their fellow prescribers. One of the most important limitations in the study was the loss of sample size due to insufficient responses, lack of consent, or inability to meet the inclusion criteria. Approximately 25.1% of participants were excluded from the study. Although exclusion may have a minor impact on generalizability, it was required to maintain data integrity and ethical compliance.

Despite careful sample size estimation, the final number of participants included in the analysis (n = 155) was lower than the minimum calculated requirement of 176 to achieve adequate statistical power. This deficit was primarily due to non-consent and exclusions based on eligibility criteria. As a result, the study may have been underpowered to detect certain associations, thus increasing the risk of a Type-II error (false negative). Consequently, some correlations, such as the relationship between medication adherence (ARMS scores) and perceived stress (PSS scores), may have appeared weak or statistically non-significant ($p = 0.414$) despite the possibility of an underlying true association. Hence, future research with larger, adequately powered samples and strategies to reduce non-response rates is recommended to validate and strengthen these findings.

Another limitation was the Hamilton Anxiety Scale (HAM-A), which rates the level of anxiety based on clinical questions, and the Numerical Rating Scales (NRS), where participants can rate their fear level on a scale (e.g., 0 to 10) in response to stimuli or events, were not included. Study highlights only the subjective means of assessment for anxiety and fear, whereas the addition of these scales would have given a better understanding of these factors in a more objective manner. The assessment of psychological variables, including anxiety and fear, was mostly subjective, despite the use of established tools such as the Brief Illness Perception Questionnaire (BIPQ), Perceived Stress Scale (PSS), and Adherence to Refills and Medications Scale (ARMS). Social desirability bias, reporting bias, and inter-individual differences in emotional Perception are all inherent risks of self-reported assessments. This reduces the objectivity of psychological evaluation and could affect the correlation between medication non-adherence and perceived stress or disease. Therefore, it is essential that both subjective and objective evaluations can be done to offer a more thorough analysis of participants' subjective sentiments.

Hence, future studies with a larger sample size taken from major tertiary care centres across the local region, along with subjective and objective evaluation of factors affecting medication adherence and their correlation to stress, are recommended, as they would give a better understanding of the correlation between factors for medication non-adherence and workplace stress.

## 6. CONCLUSION:

The present study, therefore, emphasizes the necessity of multifaceted therapies that focus on adherence support as well as stress reduction in HCPs. Stress-related obstacles might be lessened by addressing side effects, streamlining treatment plans, and providing financial support by means of providing health insurance coverage to HCPs. In order to promote more adaptive attitudes and behaviors, physicians should simultaneously evaluate and alter perspectives of their own condition through psycho-education and motivational therapies. Improving long-term results for HCPs with chronic illnesses requires comprehensive treatment models that incorporate socioeconomic support and psychological assessment programs to improve compliance with treatment. Adequate notification about diseases and their treatments in younger physicians can be useful to promote the individuals' health literacy and knowledge. Promoting concordance between healthcare providers and fellow physicians through shared decision-making and mutual understanding of treatment goals can enhance medication adherence and foster a more collaborative approach to disease management. These approaches can help to reduce non-adherence, especially in younger HCPs. In addition, providing insurance is one important factor that policymakers should pay attention to when they decide to improve the service provision system.

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### CONFLICT OF INTEREST:

The authors have no conflicts of interest.

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