# Association between Psychological Distress, Employment Status and Medication Adherence among Adult Hypertensive Patient

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**Abstract.** Prevalence of inadequate drug adherence is observed among patients diagnosed with hypertension. Individuals with hypertension may experience psychological discomfort as a result of elevated blood pressure and the adverse effects of therapy, which can impact their mental well-being. Psychiatric disorders are crucial variables to consider when examining the influence on medication compliance. Discrepancies in the research regarding the link between medication adherence and psychological discomfort, such as anxiety and depressive symptoms, emphasize the need of investigating other variables that could impact this link. Previous research has examined the correlation between employment status and psychological distress, as well as the correlation between employment status and adherence. However, none have tested the association between psychological distress, employment status, and the adherence to medication. This study aimed to explore whether employment status influences the effect of psychological distress (including symptoms of anxiety and depression) on medication adherence in adult patients with hypertension. The results of multiple linear regression analyses for secondary data indicated that employment status had a significant effect on the association between psychological distress and medication adherence. More precisely, when compared to those who were working, the adverse effect of psychological distress on the adherence to medicine was more pronounced within the unemployed population. In addition, medication adherence was poorer among younger participants, those who were employed, and those with higher systolic blood pressure. The study indicates that future research should reassess this correlation in samples with a more equitable and varied work status or contemplate using pharmacy data to assess medication adherence.

**Keywords:** Medication Adherence, Psychological Distress, Employment Status, Anxiety, Depression.

## 1. Introduction

Hypertension is a significant risk factor for the development of cardiovascular disease, and there exists a robust correlation between hypertension and the likelihood of mortality resulting from cardiovascular disease [1]. The emotional burden of hypertension can manifest itself in psychological distress [2]. In turn, psychological distress represents an additional risk factor for the development of hypertension [3]. Psychological distress is usually defined as a state of emotional distress characterized by nonspecific

mental health problems, including symptoms associated with depression and anxiety [4]. Non-adherence to antihypertensive treatment represents a significant contributing factor to uncontrolled hypertension [5]. As reported by the World Health Organization, approximately 50-70% of hypertensive patients are non-adherent to their treatment [6]. Psychological distress was associated with non-adherence among individuals with hypertension [7]. Additionally, several studies have suggested a close link between employment status and both physical and mental health [8]. However, none of the studies on medication adherence have explored the association between employment status and psychological distress. The paper aims to explore whether employment status affects the association between psychological distress and medication adherence in hypertensive patients. The results are expected to emphasize the importance of mental health in chronic disease management and provide insights for targeted interventions or psychological therapies to improve medication adherence in specific employment groups.

## 2. Literature Review

Psychological distress is a critical factor in discussions about medical adherence, particularly related to anxiety and depression symptoms. Doubova et al. studied 487 adults with hypertension and found that increased levels of psychological distress adversely affected patient self-care and led to decreased medication adherence [9]. Furthermore, individuals with slight symptoms of anxiety or depression had a 1.59-fold and 2.48-fold higher likelihood, respectively, of becoming non-compliant within the next 3 months compared to those with minimal symptoms [10]. Also, as societal psychological conditions deteriorated, increased anxiety levels had a substantial negative impact on the adherence to medication among older persons [11]. However, several studies have not demonstrated a significant association between mental health and adherence. For example, a systematic review selected 18 studies from 2002 to 2020 and found that 9 of them did not show a significant association between depressive symptoms and medication adherence [12]. The lack of consensus may be attributed to differences in study design, psychological and adherence measurements, and criteria for defining depressive and hypertensive conditions. This lack of agreement highlights the complexity of the association between psychological factors and hypertension medication adherence, suggesting this association may be influenced by other factors. Therefore, it is necessary to test additional factors that may influence this association.

There exists a strong correlation between employment status and both psychological distress and medication adherence. Specifically, a meta-analysis revealed that the occurrence of psychological disorders among those who are unemployed is 18% greater than among those who are employed [13]. Additionally, a study conducted in Sweden including 51,118 persons revealed that unemployment and temporary employment were linked to greater levels of psychological distress in comparison to permanent and self-employment [14]. Few studies have tested the association between employment status and medication adherence, with one study suggesting that unemployed individuals typically have poorer medication adherence [15][16]. Nevertheless, a later study found that unemployed or retired hypertensive participants in China had 1.5 times higher odds of adhering to their medication compared to employed participants [15]. This positive association may be due to the characteristics of the sample and the region, where access to medical services is relatively easier in Hong Kong [15]. In view of these inconsistencies, this study aimed to revisit the association between employment status and medication adherence using a sample from Northern Ghana, where access to healthcare facilities is more limited [17].

Moreover, while employment is a fundamental determinant of health status [18], it has received less attention in terms of psychological distress and medication adherence than other demographic factors such as age, gender, race, and education level. This secondary data analysis aims to address gaps in the literature by testing the effect of employment status on the association between psychological distress and medication adherence in hypertensive patients. In addition, this paper analyzes specific aspects of psychological distress, including anxiety and depressive symptoms, to test this association. It is hypothesized that employment status may influence the association between psychological distress (including anxiety and depressive symptoms) and medication adherence. This can be demonstrated if

the interaction term between psychological distress and employment status significantly influenced medication adherence. The main predictors were psychological distress, anxiety, depressive symptoms, and employment status, while the outcome variable was medication adherence.

## 3. Methodology

### 3.1. Research Design and Data Sources

This secondary data analysis used Kwakye data from a cross-sectional survey of adult patients in the Northern Region of Ghana, West Africa [19]. A total of 306 adults participated in the survey. They had been diagnosed with hypertension for at least six months, and were currently taking medication. The majority are aged between 40-60 years (46.73%), followed by 60-80 years (35.93%), 18-40 years (10.13%) and 80-100 years (7.19%). The majority of participants were female (64.38%), while males constituted 35.62% of the sample. In terms of employment status, 73.86% (226) of the participants were employed, 19.93% (61) were unemployed and 6.20% (19) were retired.

### 3.2. Variable Control

Demographic information collected included age, sex, religion, location, ethnicity, marital status, education, occupation, employment status, family history of hypertension, and co-morbidities.

Ten-item Kessler Psychological Distress Scale (K10) was used to measure psychological distress [20]. Participants reported the frequency of experiencing symptoms such as nervousness, hopelessness, sadness, worthlessness, and fatigue over the past month. Responses were rated on a 5-point Likert scale ranging from "none of the time" (1 point) to "all of the time" (5 points). The total score ranged from 10 to 50, with higher scores indicating greater psychological distress. The K10 scale can be divided into two subscales: a 4-item anxiety subscale (scoring 4-20) and a 6-item depression subscale (scoring 6-30), both of which were summed to assess specific symptoms of anxiety and depression. Previous studies have demonstrated strong internal consistency for the K10 (Cronbach's $\alpha > 0.88$). In this study, Cronbach's $\alpha$ greater than 0.64, indicating acceptable internal consistency.

Five-item Medication Adherence Report Scale (MARS-5) was used to assess medication adherence [21], which includes questions about behaviors such as forgetting doses, altering dosages, stopping medication, skipping doses, and taking less than the prescribed amount. Participants rated the frequency of these non-adherent behaviors on a 5-point scale from "never" (1 point) to "always" (5 points). The total score ranged from 5 to 25; with higher scores indicating better adherence. Prior research has shown good internal consistency for the MARS-5 across various chronic illness patient groups (Cronbach's $\alpha$: 0.67 to 0.89) [21]. In the present study, the MARS-5 demonstrated good internal consistency as well, with Cronbach's $\alpha$ greater than 0.75.

### 3.3. Statistical Analysis

Data were analyzed in R using RStudio. Three multiple linear regression models were built to predict medication adherence. The predictors of the first model included psychological distress, employment status (with levels: employed, unemployed, and retired), and their interaction term. The second and third models included employment status, either the depression symptom score or anxiety symptom score, along with their respective interaction terms with employment status. All models controlled for age, sex, religion, location, marital status, education, disease duration, number of medications taken per day, number of antihypertensive medications taken per day, and blood pressure. ANOVA was performed to evaluate whether the inclusion of interaction terms significantly improved the model fit.

## 4. Results

As shown in Table 1, using a cutoff of 24, participants generally reported relatively low medication adherence [22]. Additionally, the participants reported generally well psychological distress according to the Kessler Psychological Distress Scale [20].

**Table 1.** Descriptive Statistics

| Variable | Mean | Sd | Maximum | Minimum |
|---|---|---|---|---|
| Medication Adherence (5-25) | 22.39 | 2.73 | 25 | 14 |
| Psychological Distress (10-50) | 14.96 | 3.61 | 32 | 10 |
| Anxiety Symptom (4-20) | 5.37 | 1.54 | 14 | 4 |
| Depression Symptom (6-30) | 9.59 | 2.51 | 20 | 6 |

The assumptions for the three linear regression models were generally met. Diagnostic checks showed that points 243, 149, and 122 were influential points with high leverage and high standardized residual. Therefore, they were excluded from later analysis.

### 4.1. Association between Psychological Distress, Employment Status and Medication Adherence

**Table 2.** Model Summary

| Predictors | Estimates | Ci | P-Value |
|---|---|---|---|
| (Intercept) | 25.46 | 22.53-28.39 | **<0.001** |
| Age | 0.05 | 0.02- 0.08 | **0.001** |
| Systolic Blood Pressure | -0.04 | -0.06- -0.02 | **0.001** |
| Diastolic Blood Pressure | -0.01 | -0.04-0.02 | 0.567 |
| Psychological Distress | -0.01 | -0.10-0.09 | 0.910 |
| Employment Status (Retired) | -0.54 | -5.01-3.93 | 0.813 |
| Employment Status (Unemployed) | 4.04 | 0.43- 7.65 | **0.028** |
| Psychological Distress ×Employment Status (Retired) | 0.03 | -0.27-0.33 | 0.841 |
| Psychological Distress ×Employment Status (Unemployed) | -0.30 | -0.55- -0.06 | **0.015** |

The model that included psychological distress, employment status, and their interaction was significant ($F_{(18, 284)} = 4.66$, $p < .05$). This model accounted for 22.78% of the variance in medication adherence, with an adjusted R-squared value of 0.16. The association between psychological distress and medication adherence was slightly negative but not statistically significant (see Table 2, $\beta = 0.006$, SE = 0.05, $p > .05$; 95% CI [-0.10, 0.09]). Unemployed participants showed 4.04 higher medication adherence scores by compared to employed participants (see Table 2, $p < .05$; 95% CI [0.43, 7.65]). However, retirees did not differ significantly from employed individuals in terms of medication adherence (see Table 2, $\beta = -0.54$, $p > .05$; 95% CI [-5.01, 3.93]). The interaction term indicated that for each unit increase in psychological distress, medication adherence decreased by an additional 0.30 units in unemployed patients compared to employed patients ($p < .05$; 95% CI [-0.55, -0.06]). Figure 1 illustrates a sharper decrease in medication adherence for unemployed individuals, indicating that the negative effect of psychological distress is stronger for them compared to employed individuals. Retired individuals did not show a significant difference in medication adherence compared to employed individuals (see Table 2, $\beta= 0.03$, SE = 0.15, $p > .05$; 95% CI [-0.27, 0.33]). ANOVA comparing the models with and without the interaction term indicated that including the interaction term significantly improved model fit ($p < .05$). Additionally, age and systolic blood pressure were significant predictors

of medication adherence (see Table 2, $\beta$ = 0.05, SE = 0.01, p < .05; 95% CI [0.02, 0.08]; $\beta$ = -0.04, SE = 0.01, p < .05; 95% CI [-0.06, -0.02]).
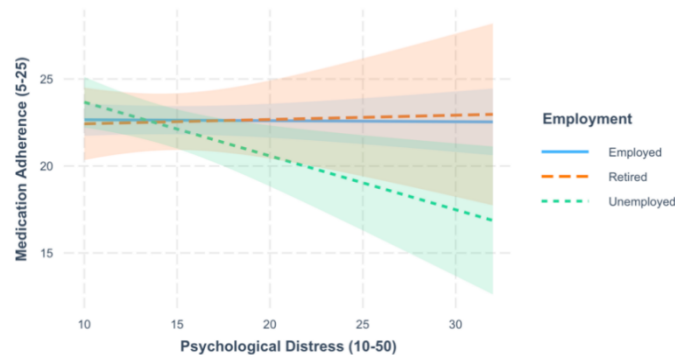


**Figure 1.** Predicted Medication Adherence Across Psychological Distress by Employment

*4.2. Association between Anxiety symptoms/Depression symptoms, Employment Status and Medication Adherence*

The model including anxiety symptoms, employment status, and their interaction was significant (F(18, 284) = 4.51, p < 0.05). This model explained 22.24% of the variance in medication adherence, with an adjusted $R^2$ value of 0.17. Only age ($\beta$ = 0.05, SE = 0.01, p < 0.05) and systolic blood pressure ($\beta$ = -0.04, SE = 0.01, p < 0.05) were significant predictors, indicating that younger patients and those with higher systolic blood pressure tend to have poorer medication adherence. The model with depression symptoms, employment status, and their interaction was also significant (F(18, 284) = 4.51, p < 0.05). This model explained 22.24% of the variance in medication adherence, with an adjusted $R^2$ value of 0.17. Similarly, only age ($\beta$ = 0.05, SE = 0.01, p < 0.05) and systolic blood pressure ($\beta$ = -0.04, SE = 0.01, p < 0.05) were significant predictors. Older participants and higher systolic blood pressure associated with lower medication adherence.

## 5. Discussion

In this study, employed participants, younger participants, and participants with higher systolic bold tend to have poor medication adherence. Current research and clinical findings suggest that effective interventions can be achieved through patient health education, management of medication, reminders and providing feedback on blood pressure monitoring [23]. The effectiveness of these interventions can be further improved by focusing more on specific populations during implementation. In addition, psychotherapies are also effective interventions for improving low adherence, such as Motivational Interviewing (MI) [24]. This study found that unemployment exacerbates the negative impact of psychological problems on medication adherence. Therefore, employment status should be considered an important factor in consulting. Targeting the negative psychological effects of unemployment in the intervention can help to improve patients' medication adherence.

However, there were limitations, one of which was the uneven distribution of participants' employment status, with a larger number of employed participants compared to unemployed and retired participants. Thus, generalizability of the results may be limited because of the small size and limited variability in the unemployed and retired groups. Future research could include a more balanced sample to confirm these results. In addition, testing medication adherence using self-report may be subject to social desirability bias. Participants may underreport the attitudes and behaviors that are socially unexpected or undesirable [25]. As a result, they may less frequently and inaccurately report their non-adherence to medication and thus overestimate their medication adherence [26]. Therefore, the validity and reliability of the findings may be compromised. Further studies could use pharmacy records to measure medication adherence and re-examine this association.

## 6. Conclusion

This study aimed to test whether employment status influences the association between psychological distress (including anxiety symptom and depression symptom) and medication adherence for patients with hypertension. Through a secondary data analysis, we found the unemployed individuals showed better medication adherence compared to employed individuals. Significantly, the correlation between psychological distress and medicine adherence is contingent upon the employment status of the individual. This correlation is particularly pronounced for individuals who are without jobs, since unemployment amplifies the adverse effects of psychological stress on compliance with therapy. Moreover, there was a positive correlation between age and medication adherence, while a negative correlation was observed between systolic blood pressure and medication adherence. Nevertheless, the applicability of the results may be restricted partly because of the unequal distribution of the three employment categories. Furthermore, the validity and reliability of results may be influenced by social desirability bias arising from self-report measures. Notwithstanding these constraints, the research emphasizes the need of taking into account work position while developing interventions to enhance persons' adherence to medication, especially in the setting of psychological therapies.

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