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Article:	Health Literacy as a Buffer: Investigating its Impact on the Relationship between Psychological Distress and Quality of Life
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ABSTRACT

This study aimed to investigate the relationship between health literacy, quality of life, and psychological distress in individuals with hypertension. A total of 180 hypertensive patients participated in the study, which utilized a quantitative research design. Non-probability, purposive sampling was employed, and data were gathered from both public and private hospitals, as well as the general population. Three key instruments were used: the Health Literacy Scale, the WHO Quality of Life questionnaire, and the Kessler Psychological Distress Scale (K-10), along with a demographic sheet. Demographic data were summarized while correlational and mediation analyses explored the relationships between the key variables. The findings revealed a significant relationship ($p < 0.01$) between health literacy, quality of life, and psychological distress. Notably, there was a strong negative correlation between health literacy and quality of life ($-.336^{**}$), suggesting that higher health literacy was linked to lower quality of life. Additionally, a significant negative relationship was observed between exercise and quality of life ($-.182^{**}$). Mediation analysis indicated the partial mediation of health literacy between psychological distress and quality of life.

Keywords: health literacy, quality of life, psychological distress, hypertension

Introduction:**Health literacy:**

The concept of health literacy originates from public health and clinical care, highlighting the importance of literacy in managing health. Research supports enhancing individuals' ability to control their health (Nutbeam, 2008). Rural residents have lower health literacy levels overall (Zahnd et al., 2009). In Italy, 54.6% of the population exhibits poor literacy skills, making it one of the highest in Europe for inadequate health literacy (Palumbo et al., 2016). Higher health literacy among university students in Pakistan is linked to greater COVID-19 awareness, promoting informed decisions and health-protective behaviors, which underscores the significance of health literacy in pandemic responses (Naveed & Shaukat, 2021). Effective health literacy initiatives aim to improve health and reduce inequalities (Freedman et al., 2009). New assessments should include public and individual health literacy dimensions, emphasizing knowledge, critical skills, and civic engagement in informed health decisions (Freedman et al., 2009).

Quality of life

Quality of life (QOL) encompasses individuals' perceptions of their well-being, influenced by culture, health, environment, and other factors (World Health Organization, 1995). Patients' contentment can be affected by deprivation, loneliness, and inadequate access to care (Pruitt, 2005). Doctors seek to promote youthful vitality, highlighting the spiritual focus of humanistic biology (Post, 2014). A quality of life model encompasses various life domains, subjective values, and objective metrics, emphasizing the importance of individual variations (Felce & Perry, 1995). A study in Italy during the COVID-19 pandemic highlighted significant barriers to healthcare access for the elderly in urban areas, necessitating age-friendly urban planning to ensure equitable service access (Guida & Carpentieri, 2021). Hood et al. (2024) asserted that physical health and well-being is strongly correlated to quality of life. The better the health the better the quality of life (Hood et al., 2024)

Psychological Distress

Psychological discomfort, defined as emotional tension linked to physical complaints, varies culturally. While it often reflects anxiety and depression, its expression, especially through somatic symptoms, differs significantly across cultures, raising questions about the validity of measurement instruments (Mirowsky & Ross, 2002). Psychological distress arises from stressors, which differ from actual stress reactions. Common stressors include relationship disputes, increased work demands, financial pressure, health issues, and exposure to traumatic events (Lindberg, 2019). Managing psychological distress involves small adjustments that can significantly impact health. Key strategies include finding equilibrium in activities, practicing self-care, relying on trusted individuals, journaling thoughts, maintaining a balanced diet, exercising regularly, ensuring adequate sleep, using relaxation techniques, and scheduling worry time to confront stressors (Lindberg, 2019).

A longitudinal study during the early COVID-19 crisis revealed a sharp increase in psychological distress across demographic groups, particularly from March to April 2020, followed by a return to baseline levels by June. This indicates that individuals may adapt and develop resilience in response to the pandemic's challenges (Daly & Robinson, 2021). Together, these studies underscore the importance of addressing psychological distress through targeted interventions and supportive environments.

Hypertension

Hypertension, defined as blood pressure exceeding 140/90 mm Hg, affects over 40% of the population globally and is often asymptomatic, earning it the title "silent killer." Its prevalence increases with age, contributing to cardiovascular diseases and other serious conditions, resulting in higher healthcare costs. Treatment options include dietary changes, exercise, and medications, yet only 29% to 50% of treated individuals have their blood pressure under control, primarily due to inadequate medication adherence. Factors contributing to poor adherence include age-related changes and a lack of awareness about hypertension's health risks (Delavar et al., 2020).

The Health Literacy Index (HLI) assesses the suitability of educational materials for patients' HL levels, but evidence on the efficacy of HLI-based interventions is limited. A study showed HLI-based education improved older adults' understanding of fall prevention, indicating the need for further research on the effectiveness of SME tailored to HL in managing primary hypertension (Delavar et al., 2020).

Literature Review

The prevalence of chronic diseases, particularly hypertension, is a major public health issue globally. Hypertension, often referred to as the silent killer, affects over 1.5 billion people and causes more than 7 million deaths annually. Low health literacy, defined as the ability to understand health information, is prevalent among vulnerable populations, including the elderly and those with chronic illnesses. Despite the association between health literacy and disease outcomes, the link between health literacy and blood pressure control remains inconsistent (Naimi et al., 2017).

The study "Hypertension Awareness and Psychological Distress" by Hamer et al. (2012) highlights that aware hypertensive participants experience greater psychological discomfort than uninformed ones. In the UK, untreated hypertension was more prevalent among the elderly, decreasing from 29.7% in 1986 to 21.5% in 1995. Additionally, an inverse relationship between education level and psychological distress was noted, alongside a correlation between hypertension and distress. It's recommended to consider education and social class in psychological assessments (Borie et al., 2024; Shiue, 2010).

Research indicated significant gender differences in psychological distress, with women experiencing higher levels than men. Factors such as stress, coping mechanisms, social support, and time management play crucial roles. Psychological distress is linked to time spent on various activities, highlighting how traditional gender roles influence mental health (Matud et al., 2014). Additionally, a systematic review found that objective measures of the urban environment, such as green space and neighborhood quality, are associated with psychological discomfort, suggesting urban planners should consider these factors to improve mental health (Gong et al., 2016).

Among university students, psychological distress correlates with poor academic performance and unhealthy behaviors, emphasizing the need for support systems during stressful academic periods (Sharp & Theiler, 2018). Healthcare professionals have also faced significant mental health challenges during the COVID-19 pandemic, prompting recommendations from organizations like the WHO for stress reduction and support strategies (Petzold et al., 2020).

Another study on hypertension indicated a significant prevalence of sleep disturbances, which are linked to psychological distress and health-related quality of life (HRQOL). Interventions to reduce sleep disturbances may enhance symptoms and HRQOL (Matura et al., 2014).

Hypertension is a chronic illness that worsens health literacy and quality of life (HRQL). A Swedish study using the SF-36 questionnaire revealed that hypertensive individuals scored lower in most HRQL domains, especially those with comorbidities like diabetes, angina, or past strokes (Bardage & Isacson, 2001). In Pakistan, a study found a weak correlation between hypertension knowledge and HRQoL, suggesting more factors impact well-being (Saleem, 2012). Additionally, psychological distress, including stress and anxiety, is common in hypertensive patients. This study aimed to explore the relationship among hypertension, health literacy, quality of life, and psychological distress to improve patient outcomes.

Keeping in view the given perspective the present study aimed to investigate relationship between health literacy, quality of life and psychological distress among patients with hypertension. By examining the impact of health literacy on the levels of psychological distress and quality of life among these individuals, the study seeks to provide valuable insights for further planning and implementation of the suitable interventions for people suffering from hypertension. The findings of this research may have applications in clinical practice, especially in the early management of hypertension when there is still opportunity to improve health-related quality of life.

Objectives

Objectives of the study were to

1. Determine relationship between Quality of life, psychological distress and Health literacy among patients with hypertension.
2. Examining the mediating effect of health literacy on psychological distress and quality of life.
3. Evaluate how exercise affects hypertension patients' quality of life.

Methodology

Sample

This cross-sectional study was carried out on a sample of 180 patients with hypertension patients (age ranging from 18 to 70 years) employing purposive sampling technique. These patients were recruited from both public and private hospitals. Ten hospitals were approached from both public and private sector. After getting formal permission from the authorities of the hospitals the sample was approached at the Out Patient Departments (OPDs) of the hospitals. Participants were briefed about the objectives of the study and written informed consent was signed before the start of the data collection.

Instruments

The constructs were measured using the *Health Literacy Scale*, *WHO Quality of Life Scale*, and *Kessler Psychological Distress Scale*.

- Health literacy scale consisted of sixteen items to address the general health literacy of the participants. The number of responses for all items were same. All of the response options fall on a scale from 0 (don't know) to 4 (very difficult) (Nguyen et al., 2017).

- The WHOQOL-Brief have four domains and two individually scored items about an Individual's overall perception of quality of life and health. The first domain includes questions related to physical health, second is related to psychological health, third involves questions about social relationships and in forth domain questions are about environment. Higher scores indicate a higher quality of life, with the four domain scores scaled in a positive direction. Prior to scoring, three WHOQOL-Brief questions must be reversed (WHOQOL group, 1998).
- Kessler Psychological Distress Scale is a tool for measuring psychological distress. Ten items on emotional states are included in this scale, and each item has a five-level response scale. The test can be used as a rapid screening method to gauge how uncomfortable you are. The patient may be given the form to complete on their own, or the clinician may read the questions aloud to them (Kessler et al., 2002).

Procedure

After taking permission from the hospital authorities' patients with hypertension in OPD were provided thorough instructions about how to give complete and honest information about the questions were being asked. They filled out all the questionnaires along with demographic sheet. Data collection was completed in three months from May 2023 to July 2023. After collecting all the data different analysis were performed using Statistical Packages for Social Sciences (SPSS).

Ethical Consideration

The departmental ethics committee granted approval for the study. They study followed the guidelines of Declaration of Helsinki as well as American Psychological Association (APA 2020). Only those participants were selected who gave consent about participation. They were assured about the privacy as well as confidentiality of the information. No harm was provided to participants on economic, psychological and physical level.

Results

The results section provides a description of the statistical analysis used in the study. This research portion offers a statistical analysis of the relationships between variables. A statistical analysis was conducted using SPSS, version 25.0, a social science tool. This section explain the frequency description of demographics variables of samples participated in current study (n=180)

Table 1 : Descriptive analysis of data (N=180)

Variable	n	Percentage %
General Health		
Fair	54	30.0
Bad	82	45.6
Very bad	29	16.1
Good	15	8.3
Duration of illness		
5 years and less	86	47.8
6 to 10 years	60	33.3
11 to 15 years	13	7.2
16 to 20 years	9	5.0
21 and above	12	6.7
Exercise		

Yes	75	41.7
No	105	58.3

Note: N=180

Table 1 presents a sample of participants (n=180), with females (n=117, 65%) and males (n=63, 35%). The majority were above 40 years (n=134, 74.4%), and most were married (n=162, 90%). Education levels, family systems, socio-economic status, general health, illness duration, and exercise habits were also given.

Table 2 Relationship between quality of life (QOLT) and health literacy and psychological distress (N=180)

Variables	1	2	3
Health literacy	-	.14*	-.55**
Psychological distress		-	-.47**
Quality of life			-

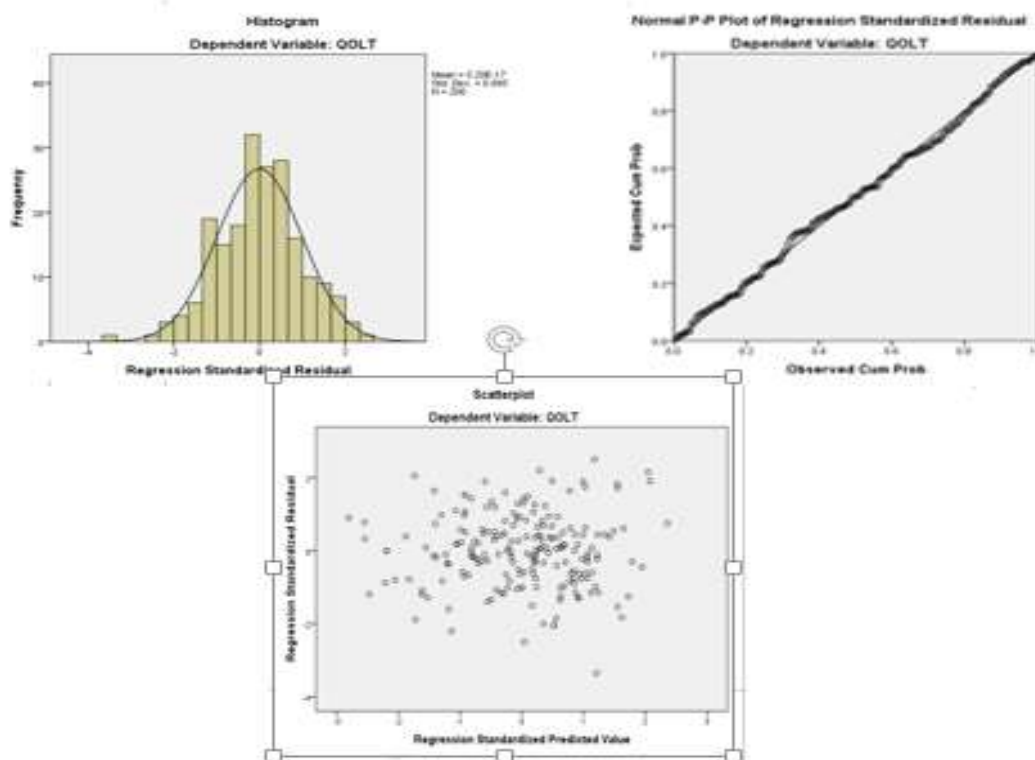
Note: * $p < .05$ ** $p < .01$

The quality of life (QOLT) and health literacy (DHLQT) have a statistically significant yet strong negative correlation ($p < 0.01$). Moreover, psychological distress (PDT) and quality of life also have strong negative significant relationship with each other. Additionally, this table demonstrated that health literacy showed a weak significant correlation with psychological distress.

Table 3 Regression Analysis for Mediation of Health literacy between Psychological distress and quality of life

Variable	B	95% CI	SE	β	R^2	ΔR^2
Step 1					.22	.22
Constant	98.52***	[92.66, 104.38]	2.97			
Psychological distress	-.68***	[-.23, -.16]	0.08	-.47***		
Step 2					.46	.24
Constant	114.62***	[108.67, 120.56]	3.02			
Psychological distress	-.57***	[-.72, -.42]	-.40	-7.65***		
health literacy	-.65***	[-.79, -.52]	-.49	-9.63***		

Table 3 reported findings of mediation analysis of health literacy with psychological distress and quality of life. It can be seen that predictors explain a total of 46% variance in quality of life $F(2, 197) = 84.38$, $p < 0.001$ with health literacy being the partial mediator. The results showed that psychological distress significantly and negatively predicted quality of life ($\beta = -.47$, $p < 0.001$).



The histogram plot indicated the well fitted distribution of standardized residuals which is a positive indication. In summary the distribution of the residuals appeared to be fairly symmetric.

The P-P plot showed that the residuals mostly follow a straight line, indicating that they are approximately normally distributed. However, there are some deviations from the line at both the lower and upper tails, implying slight departures from normality, potentially due to outliers or skewness in the data.

The slight fanning out in the scatterplot indicated potential mild heteroscedasticity, where the variance of the residuals is not constant.

Table 4 mean differences between exercise and quality of life of the participants (N=180)

Variable	Exercise				<i>t</i> (178)	<i>p</i>	Cohen's D
	Yes	SD	Never	SD			
Quality of life	79.24	10.95	76.05	9.69	2.06	0.04	0.31

The table 4 shows that there is significant mean difference of exercise and quality of life ($p < .05$). Those who performed exercise showed higher mean values described better quality of life than those who do not.

Table 5 Mean differences between health literacy and quality of life of patients with hypertension (N=180)

Variable	General Health				<i>F</i>	<i>p</i>
	Good	Fair	Bad	Very Bad		
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		

Quality of life 80.29(8.86) 77.79(10.96) 75.34(10.05) 68.6(6.76) 5.918 0.001

This table 5 indicated that there were significance mean difference of general health and quality of life ($p < .001$).

Table 6: LSD Post hoc analysis of health literacy and Quality of Life (N=180)

(I) General Health	(I-J)	S.E	p	95% Confidence Interval	
				LL	UL
Good	fair	2.50	0.15	-0.93	5.94
	Bad	4.95147*	0.03	0.44	9.46
	very bad	11.69630*	0.00	5.98	17.41
Fair	Bad	2.45	0.26	-1.78	6.68
	very bad	9.19268*	0.00	3.69	14.69
Bad	very bad	6.74483*	0.03	0.51	12.98

*. The mean difference is significant at the 0.05 level.

People who had good general information about their health showed statistically significant differences from people with very bad or bad health literacy ($p < .001$, $p < .05$) on quality of life respectively. Subsequently, those who had fair information about health literacy showed significant differences from people who have bad or very bad information. Additionally, the differences among bad and very bad were evidently significant.

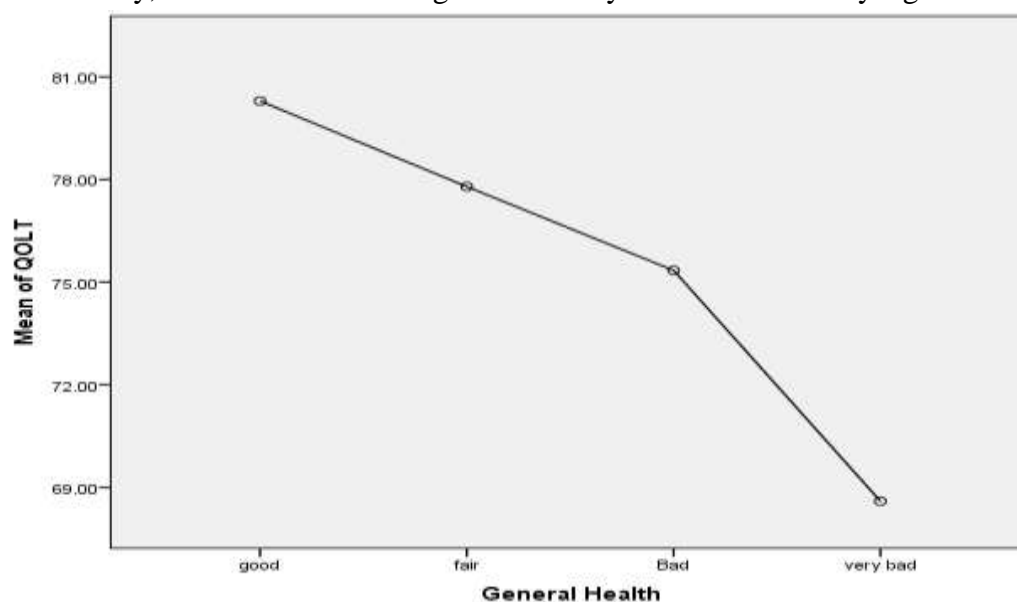


Fig: Graphical representation of mean differences between health literacy and quality of life of patients with hypertension

The above graph showed that those who have good information about health literacy had better quality of life which is getting worse as their information is getting lesser.

Discussion

This study's main goal was to investigate the connection between health literacy, quality of life, and psychological distress experienced by people having hypertension. In order to measure relationship, three distinct scales were employed: health literacy scale (DHLQT), quality of life scale by WHO, and Kessler Psychological Distress (K-10) using a correlational approach. Data collection was carried out with 180 participants who were chosen on purpose. The collected data underwent analysis using SPSS version 25. The results of the study were discussed below in detail.

The purpose of the study was to determine the relationship between health literacy and life satisfaction and psychological distress. The findings of this research revealed a relationship among all the variable. These results of the current study aligned with previous studies that had also indicated association between these variables (Uddin et al., 2017; Zhang et al., 2023). Zheng et al. (2018) conducted a meta-analysis of the connection between quality of life and health literacy and the findings showed that there was statistical significance in the correlation coefficients between QOL and health behavior, health belief, health knowledge, and health skill, and that the relationship between HL and QOL was moderate. Moreover, researchers and health managers are more interested in whether raising health literacy would improve people's quality of life. Malfa et al. (2021) demonstrated that association between psychological distress and QOL, with neither variable being positively associated. The term "health skill" describes a person's capacity to translate health knowledge into healthy actions. It acts as a bridge between health behavior and health information. Health status and QOL are improved by good health skills. A person's health skills will also improve if they have mental health issues that are directly tied to how well their life is going (Çelik et al., 2023).

The results of the previous studies showed consistent results given in table 2 (Matura et al., 2014; Olsson et al., 2021) Patients with pulmonary arterial hypertension (PAH) may experience a lower quality of life (QoL) depending on their mental health. However, these people have not had their mental illnesses carefully evaluated. It was concluded from this study that individuals with PAH frequently experience mental illnesses, especially adjustment disorder, significant depression, and panic disorder, which lowers QoL in these individuals. The most prevalent mental health illnesses can be screened for using the Hospital Anxiety and Depression Scale. Future research must focus on treatment plans for patients with PAH who have mental issues (Matura et al., 2014; Olsson et al., 2021).

The results table 3 and figure 1 illustrate the mediating role of health literacy between psychological distress and quality of life. These results are in line with earlier studies that found that distress is a significant factor influencing health literacy (Du et al., 2018) The study's objective was to examine the literature regarding the connection between health literacy and hypertension patients' health outcomes. There were nineteen publications in the review. It was generally known that people with hypertension who were less literate knew less (Bardage, & Isacson 2001). The available data did not consistently support health literacy, behavioral outcomes like self-care, self-efficacy, and adherence, clinical outcomes like blood pressure control, systolic and diastolic blood pressure, or patient-physician interactions outcomes like patient-physician communication, patient trust, and participation in decision-making. According to this study, individuals with low health literacy are more likely to know only a portion of the facts regarding hypertension. Nevertheless, insufficient data makes it impossible

to conclude that improved outcomes from hypertension are solely related to health literacy (Nutbeam, 2008).

The table 4 of the study aimed to explore the association between exercise and quality of life. The findings of the present study affirmed the presence of a significant and positive relationship between these variables. Consistent with these findings Vagetti et al. (2014) reviewed data on the relationship between physical activity (PA) and quality of life (QoL) in the elderly, as well as identifying the study designs and measurement tools most frequently employed to do so between 2000 and the present. In general, the studies examined in this review found a link between PA and older adults' quality of life. The type of intervention/observation and the tools employed to quantify the dependent variable, as well as the consistency of the correlation, differed among various samples (Vagetti et al., 2014).

Additionally results of table 5 and 6 depicted differences among general health literacy and quality of life. The results were evident that those who have good knowledge of their health had better quality of life than those who do not. Studies suggested that understanding various mental health treatments and patient education materials often requires a high level of health literacy (Haeri-Mehrzi et al., 2024). Health illiteracy can have a significant negative impact on all aspect of a person life. If illiteracy is not recognized and treated, possibilities for illness prevention or treatment may go unnoticed, with potentially negative consequences for one's health, quality of life and wellbeing (Andrus & Roth, 2002; Hood et al., 2024)

Consequently, it is clear that these three factors health literacy, life satisfaction, and psychological distress are interlinked. The findings of the previous literature confirm the hypothetical statements of the present study. The regression analyses provide further insights into the predictors of health literacy, quality of life and, psychological distress among people with hypertension.

Conclusion

In conclusion, the recent study set out to explore the relationship between HL, QOL, and PD among hypertensive individuals. Results of the study highlighted the importance of exercise and its relationship with both quality of life and health literacy. The study also concluded that patients although having a long duration of the disease were unable to become aware of it because hypertension is a covert illness and its symptoms are not easily detected in the beginning. Thus, illness and duration of illness were found to be significant determinants of quality of life in the current study. General health was a strong predictor of quality of life according to regression analysis. The findings of this study can be used to direct more extensive research on a related subject in future.

Recommendations and Implications

The study was not carried out with larger sample, future researchers can use the findings to conduct research among different chronic illness at larger scale. Future research may investigate various other psychosocial correlates of health literacy quality of life, and psychological distress and it may employ longitudinal designs to establish causal links between the predictors and dependent variables. Additionally, looking at other demographics and cultures could offer a more thorough grasp of the variables influencing these characteristics. Based on current study findings; for improving the quality of life and physical and mental wellness of the hypertension, educational institutions and government should introduce certain policies that help for improving the life satisfaction of hypertensive patients. The current study

findings can be used as an awareness about how health literacy, quality of life and psychological distress can impact the life of hypertensive persons. The data and findings of current study can be used by other researchers studying the same or similar variables in their studies.

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