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RESEARCH ARTICLE

An Exploratory analysis of determinants influencing the quality of life in individuals diagnosed with Pulmonary Arterial Hypertension

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Abstract: Pulmonary arterial hypertension (PAH) is a rare condition characterized by elevated blood pressure in pulmonary arteries, with an incidence of 15-50 cases per million annually. Improving QOL and increasing survival are the two main objectives of PAH treatment. So to understand and address the multi factors that affect the QOL for providing the holistic patient centric care approach to improve the QOL. A cross-sectional observational study was conducted with in a span of 6-month, chi-square test & regression analysis were employed to examine the association. Patient information was gathered directly from the case sheet additionally physical examination like Blood pressure, SPO2, RR were individually taken. The St. George's Respiratory Questionnaire (SGRQ), Kuppuswamy scale, Morisky medication adherence scale was employed to understand the association between those factors. Our study explores the several factors affecting QOL of PAH patient. Our observation shows that majority of the patient at the age from 61 to 80 and >80 is having low QOL ($p<0.001$). A significant difference was found between SGRQ and overweight ($p=0.03$) and also smoking history, low socioeconomic status and poor adherence of drug had negative impact of QOL on both chi square and regression analysis. Our study shows that there is profound and severe influence on the QOL of individual grappling with PAH. The complex interaction between those factors contributes on understanding the challenges face by PAH patient reflect the urgent need of comprehensive care strategies. This study supports our hypothesis that demographic, socioeconomic, clinical factor impact the QOL on PAH patient.
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Keywords: Pulmonary Arterial Hypertension; Quality of Life; St. George's Respiratory Questionnaire; Kuppuswamy Scale; Morisky Scale.

1. Introduction

Individual health can't be described on having a medical condition; it is also about how the condition affect everyday life. PAH is a complex condition characterized by elevated blood pressure in pulmonary arteries. [1, 2] Living a life with a disease that is life-limiting such as Pulmonary Arterial Hypertension can lead to many problems on a patient. In our research we try to find out all the factors affecting person quality of life while dealing with PAH. [3] Pulmonary hypertension (PH), a broad category of chronic, progressive disorders, is defined by an increase in pulmonary artery pressure that can be caused by several factors. Hypertension in the heart occurs when left untreated. It may result in fatality if right ventricular failure occurs. A patient's diagnostic workup and management typically include assessments of a variety of severity and prognosis indicators, including the Borg Dyspnoea Index, the World Health Organization functional class (WHO FC), the 6-minute walking distance (6MWD), and several laboratory biomarkers, including invasive hemodynamic evaluation. Still, these metrics are not accurate enough to evaluate the overall health and quality of life (QoL). [4] What is looked at, though, is the narrower definition of health-related quality of life (HRQoL), sometimes known as "the measure of quality of life in clinical trials." the way a patient feels about how an illness affects their ability to function and how that condition is treated. HRQoL may be a particularly relevant result in PAH. Current PAH medications can cause serious adverse events, often require unique drug delivery systems, and require regular dose and monitoring. Because of this, new and evolving treatments may increase exercise capacity and pulmonary hemodynamic, but they may or may not also improve quality of life.[4]

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The main objective of this work is to analyze the following factors and visualize the actual picture of what a life is like for people with PAH.

• The QOL will be affected proportionally with age.

• Obesity will also affect the QOL of PAH patient.[5]

• Patients with very poor medication adherence are more likely to have severe PAH.[6]

• Comorbidity and smoking habit on PAH patient affect the patient QOL [7].

• PAH is more commonly dragonized in female but the QOL depends on the individual

• Severity/stage of PAH

2. Material and methods

2.1. Study design

A cross-sectional observational study was conducted with in a span of 6 month to assess factors affecting the quality of life in patients with Pulmonary Arterial Hypertension (PAH). All the patient diagnosed with PAH as a primary respiratory condition appearing at OPD of GSL hospital were included in our study. Severally ill patient and patient not willing to participate are excluded from our research. Patient information was gathered directly from the case sheet additionally physical examination like BP, SPO2, RR were individually taken. The St. George's Respiratory Questionnaire (SGRQ) was employed in this study to assess the quality of life in patients with Pulmonary Arterial Hypertension (PAH).[8] To determine the other factors Kuppuswamy scale, ,Morisky adherence scale and pulmonary artery hypertension severity scale was used

2.2. Statistical tests

To chi-square tests were employed to examine the association between various factor and the quality of life of PAH patient. A significant level was set up to $p<0.05$ to determine the statistical significance between the variables.

3. Results

Table 1 outlines the demographic and clinical characteristics of individuals diagnosed with Pulmonary Arterial Hypertension (PAH) and their association with the quality of life (QOL), as measured by the St. George's Respiratory Questionnaire (SGRQ) scale. The observed trends and statistically significant findings demonstrate the key factors influencing the QOL in PAH patients.

3.1.1 Age Distribution

The age distribution of the study population reveals a significant impact on QOL, with individuals under the age of 40 experiencing a notably lower QOL compared to other age groups. This finding suggests that younger PAH patients may face unique challenges that impact their overall well-being.

3.1.2 Body Mass Index (BMI)

The BMI categories demonstrate a correlation with QOL, with severely underweight individuals and those in the obese class 2 category exhibiting a lower QOL. This underscores the importance of nutritional status and weight management in enhancing the QOL of PAH patients.

3.1.3 Smoking History

Notably, a substantial percentage of PAH patients with a smoking history reported a lower QOL. This emphasizes the detrimental effects of smoking on the health status and QOL of individuals with PAH. Smoking cessation interventions may prove beneficial in improving the overall well-being of these patients.

Table 1. Demographic and clinical characteristics of the patients involved in the study

Characteristics	Class	Percentage	(P-Value)
Age	<40	12.8%	0.001
	40-60	41.4%	
	61-80	35.7%	
	81-100	10%	
BMI	Severely underweight	14.2%	0.03
	Underweight	5.8%	
	Normal	25.7%	
	Over weight	20%	
	Obese class1	21.4%	
	Obese class2	5.7%	
Smoking	Smoking history	65.7%	0.001
	Non smoker	34.2%	
PAH Severity	Mild PAH	37.1%	0.03
	Moderate PAH	37.1%	
	Severe PAH	25.7%	
Blood pressure	111/71 – 120/80	14.3%	0.01
	121/81- 140/100	48.5%	
	>141/101	37.1%	
Socioeconomic class	Lower class	27.1%	0.001
	Upper class	40%	
	Lower middle class	32.8%	
Medication adherence	High adherence	34.2%	0.001
	Low adherence	37.1%	
	Very low adherence	28.6%	

Chi-square tests were conducted for all variables with the St. George's Respiratory Questionnaire (SGRQ) scale. The obtained p-values for all variables were less than the set value ($P<0.05$), indicating that all the mentioned factors significantly impact the Quality of Life (QOL) in PAH patients

3.1.4 PAH Severity

The severity of PAH has a significant impact on QOL, with individuals diagnosed with severe PAH experiencing a lower QOL compared to those with mild or moderate PAH. This underscores the importance of early detection and intervention to mitigate disease progression and improve patient outcomes.

3.1.5 Blood Pressure

The blood pressure categories also exhibit a correlation with QOL, indicating that individuals with higher blood pressure readings tend to have a lower QOL. Blood pressure management may, therefore, play a crucial role in enhancing the overall well-being of PAH patients.

3.1.6 Socioeconomic Class

Socioeconomic status emerges as a substantial determinant of QOL in PAH patients, with those in the lower socioeconomic class reporting a lower QOL. This highlights the need for targeted interventions and support systems to address the unique challenges faced by individuals with limited financial resources.

3.1.7 Medication Adherence

The study reveals a significant association between medication adherence and QOL in PAH patients. High adherence to prescribed medications positively correlates with a higher QOL, emphasizing the importance of medication management in improving patient outcomes

3.2 Correlation analysis

The negative correlation observed in the analysis suggests that as one variable increases, the other tends to decrease. Specifically, the age factor exhibits a statistically significant negative correlation with several key variables, including the total score on the St. George's Respiratory Questionnaire (SGRQ) scale, the Kuppuswamy scale for the year 2022, smoking habits, medication adherence, and the smoking scale. In the context of the SGRQ scale, the total score is found to be significantly correlated with age, the Kuppuswamy scale for the year 2022, and smoking habits. This implies that as the age of the individuals increases, there is a corresponding decrease in the total score on the SGRQ scale. Furthermore, the negative correlation with the Kuppuswamy scale and smoking habits suggests that higher age is associated with lower scores on these scales, indicating potential implications for respiratory health and lifestyle factors. The negative correlation observed with medication adherence and the smoking scale suggests that, as age increases, there tends to be a decrease in both medication adherence and the extent of smoking. This finding underscores the importance of considering age as a relevant factor in understanding variations in medication adherence and smoking behaviors among the study participants. The results of correlation analysis are shown in Table 2.

Table 2. Correlation analysis output from JMP software

Correlations

			AGE	TOTAL SCORE	KUPPU SWAMY	SMOKING	MEDICATION ADHRNC	SMOKING SCALE	BMI	BP
Spearman's rho	AGE	Correlation Coefficient	1.000	.327**	-.293*	-.356**	.320**	.393**	.008	-.158
		Sig. (2-tailed)	.	.006	.014	.002	.007	<.001	.946	.192
		N	70	70	70	70	70	70	70	70
	TOTAL SCORE	Correlation Coefficient	.327**	1.000	-.920**	-.441**	.974**	.424**	-.040	-.400**
		Sig. (2-tailed)	.006	.	<.001	<.001	<.001	<.001	.739	<.001
		N	70	70	70	70	70	70	70	70
	KUPPU SWAMY	Correlation Coefficient	-.293*	-.920**	1.000	.399**	-.919**	-.417**	-.015	.459**
		Sig. (2-tailed)	.014	<.001	.	<.001	<.001	<.001	.901	<.001
		N	70	70	70	70	70	70	70	70
	SMOKING	Correlation Coefficient	-.356**	-.441**	.399**	1.000	-.399**	-.631**	.155	.289*
		Sig. (2-tailed)	.002	<.001	<.001	.	<.001	<.001	.200	.015
		N	70	70	70	70	70	70	70	70
	MEDICATION ADHRNC	Correlation Coefficient	.320**	.974**	-.919**	-.399**	1.000	.417**	-.009	-.363**
		Sig. (2-tailed)	.007	<.001	<.001	<.001	.	<.001	.940	.002
		N	70	70	70	70	70	70	70	70
	SMOKING SCALE	Correlation Coefficient	.393**	.424**	-.417**	-.631**	.417**	1.000	-.157	-.253*
		Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	.	.193	.034
		N	70	70	70	70	70	70	70	70
	BMI	Correlation Coefficient	.008	-.040	-.015	.155	-.009	-.157	1.000	-.183
		Sig. (2-tailed)	.946	.739	.901	.200	.940	.193	.	.130
		N	70	70	70	70	70	70	70	70
	BP	Correlation Coefficient	-.158	-.400**	.459**	.289*	-.363**	-.253*	-.183	1.000
		Sig. (2-tailed)	.192	<.001	<.001	.015	.002	.034	.130	.
		N	70	70	70	70	70	70	70	70

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

3.2. Discussion

3.2.1. Age

We found that among the 70 patients in our study, 50% were women and the remaining men were evenly divided between the sexes. Men are overrepresented in the mild PAH compared to females. The age groups of 41–60 and 61–80 comprised the bulk of patients, with the age group of >81 having the fewest patients. Based on their BMI, we also separated the patients in this study into several age groups. We found that obese class 1 individuals were more common in the age range of (41-60) (61-80). Some individuals who were overweight were found to be in the age range of (41-60).

3.2.2. PAH

This study suggests that patients with extremely low medication adherence have a higher risk of developing severe PAH. According to our research, individuals in the obese class 1 have bad health, and the severity of their disease increases with body mass index. Patients with a BMI below average are also particularly vulnerable to PAH. It is our finding that patients with a lower socioeconomic status than those with a higher socioeconomic status suffer more severe PAH)

3.2.3. SGRQ

In our study, we discovered that patients in the groups (61-80) and (>81) had lower QOL compared to those in the other categories. Our research indicates that the health conditions of patients with lower socioeconomic status are worse than those of patients with upper lower and lower medium socioeconomic status. According to our research, people who do not take their medications as prescribed are more likely to have less than ideal health results. According to our research, people in the obese class 1 have poor health; that is, their quality of life decreases with increasing BMI. Individuals with BMIs below the underweight range experience considerably lower quality of life standards. In comparison to patients in other categories, those with blood pressure between [(121/81) -(140/100)] had a lower quality of life (QOL), according to our study. The particular medical conditions that patients in categories [(111/71) -(120/80)] have, which include other severe respiratory issues, also contribute to their lower quality of life. In our study, patients who have never smoked or who have stopped were assigned a score of 0. This shows that patients who smoke still have a lower quality of life (QOL) than patients who have never smoked or who used to smoke. Patients with grades 2, 3, and 4 had a somewhat worse quality of life, according to our research. We can see that some patients have low quality of life even though they have less severe problems with sobbing. We can conclude that the majority of the patients in our study have sedentary lifestyles, so their quality of life is not very poor.

4. Conclusion

The study concludes that a patient's quality of life is impacted by variables such as age, gender, socioeconomic status, smoking habit, BMI, and the severity of PAH. SGRQ scores increase with age in PAH patients, which eventually results in a decline in their quality of life. The general quality of life is generally lower in patients who take their medications less consistently. Patients with lower socioeconomic status have a higher likelihood of having more severe PAH, which results in a higher SGRQ score and a lower quality of life. Even long-term smokers have a higher SGRQ score because they are more likely to have severe PAH and a lower socioeconomic status. Patients with sedentary lifestyles—such as those who are obese—also have lower quality of life scores on the SGRQ. Our research concludes that age, gender, BMI, smoking habit, socioeconomic status, and severity of PAH have a significant impact on a patient's quality of life. Furthermore, our research has shown that dyspnea and occupation have a negligible effect on quality of life.

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Author's short biography

Sanjana:

Sanjana is an aspiring Pharm D student with a passion for optimising patient healthcare through comprehensive pharmaceutical care. Currently pursuing Pharm D program with a focus on drug therapy optimisation, patient counselling. Eager to apply theoretical knowledge in real world clinical settings. Demonstrates strong work ethic, adaptability and a commitment to ongoing professional development in the dynamic field of pharmacy.

Santoshi Saladi:

Santoshi Saladi is a dedicated Pharm D student immersed herself in the world of pharmaceuticals to foster a profound understanding of medications. With a passion for patients care she combines clinical expertise and compassionate communication to ensure optimal health outcomes. Her journey is a testament to relentless commitment to the intersection of science and service.

Naga Kireeti Seru:

Naga Kireeti is a committed Pharm D student deeply involved in providing clinical pharmacy services. Enthusiastically exploring the nuances of clinical pharmacy practice, Naga also fosters a strong interest in research pursuits. With a fervour for educating patients about medications and a sharp focus on drug dosing and interactions, Naga aims to make a significant contribution to the pharmacy field.

Rinta Vincent:

Rinta Vincent is a Pharm D student with a passion for improving health and outcomes. Armed with solid foundation in pharmaceutical sciences, clinical expertise and patient care. She aspires to contribute to the advancement of pharmaceutical practices. Rinta's commitment to lifelong learning and her ability to integrate research into practical solutions, make her a promising professional in the ever-evolving field of pharmacy.

Mukesh Kumar Gupta:

Mukesh Kumar, an ardent Pharm D student, actively participates in delivering clinical pharmacy services. Exploring the intricate domains of clinical pharmacy practice. He nurtures a profound interest in research pursuits. With a passion for educating patients on medications and a dedicated focus on drug dosing and interactions, Mukesh aspires to bring valuable contributions to the field of pharmacy.

Dr. Anju K Abraham:

Dr. Anju K Abraham is an Pharm D professional and Associate professor with a wealth of one year of experience at Aditya College of Pharmacy. Graduating with honours, she earned her Doctor of Pharmacy degree from Rajiv Gandhi University, Karnataka. Her passion for advancing pharmaceutical knowledge led her to pursue a career in academia.

Dr. Somanath Dash:

Dr. Somanath Dash, a distinguished leader in the field of respiratory medicine, serves as the Head of the Respiratory Medicine Department at GSL Medical College and General Hospital. With a career span of nearly two decades, Dr. Dash has consistently demonstrated an unwavering commitment to advancing pulmonary healthcare. Dr. Dash's clinical expertise is paralleled by his dedication to the medical education. As a respected professor, he has mentor and inspired the next generation of pulmonologists, fostering a culture of excellence within his department.