

# Medication Adherence and Health Related Quality of Life among Patients with Chronic Obstructive Pulmonary Disease in Pokhara

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## ABSTRACT

**Background:** Chronic obstructive pulmonary disease (COPD) is a common preventable and treatable chronic disease. Patients have to consume medicine for longer duration which usually leads to non adherent to medicine in long term due to various socio-economic factors such as financial status, economical status of patients. This study focuses on nature of medicine adherence among COPD patients, factors affecting medicine adherence of the patients and influence of medicine adherence on Health related Quality Of Life.

**Methods:** A descriptive analysis study was done among known case of COPD cases after obtaining approval from ethical review board of NHRC. A written consent was obtained from all the participants. Morrisky Medication adherence scale was used to access medication adherence among patient where as st. George 's Respiratory Questionnaire for COPD was used to evaluate Health related Quality of life of the patients.

**Results:** Among 350 cases analyzed, majority (n= 217; 63%) of the cases were poorly adherence to medicine. There was significant association between rural residence of patients, poor financial status, low education status, longer disease duration, lack of financial support, nuclear family type and poor adherent to medicine ( $p < 0.05$ ). There was also significant association between poor medicine adherent and poor Health related Quality of Life. ( $P < 0.05$ ).

**Conclusion:** These patients experienced a severe impact on their symptoms, considerable limitations in daily activities, a higher burden of disease, and an overall reduction in their quality of life.

**Keywords:** *chronic obstructive, Medication adherence, quality of life, Pokhara.*

## INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a common preventable and treatable disease characterized by persistent respiratory symptoms and airflow limitation due to airway and alveolar abnormalities.<sup>1</sup> COPD is likely to increase in coming years due to higher smoking prevalence and aging populations in many countries.<sup>2</sup> The prevalence of COPD in Nepal was 11.7%, which increased with age, and higher in those with a low educational level, those who had smoked  $\geq 50$  pack-years, persons having a low body mass index (BMI), and residents of Karnali province.<sup>3</sup> COPD can negatively affect everyday life of patients leading to increased health care costs and long-term adverse effects on health status.<sup>4</sup> Besides smoking cessation and other non-pharmacologic treatment, medication plays an important role in the current treatment of COPD. Pharmacological treatment helps to relieve symptoms, improve lung

function, and reduce the exacerbation risk. The most frequent medications to control COPD include short/long-acting bronchodilators, inhaled corticoids, or a combination of them.<sup>5</sup> COPD treatment typically involves multiple medications, which can lead to adherence problems. The chronic nature of the disease and periodic remission of symptoms also contribute to increased risk of adherence issues in patients with COPD.<sup>6</sup> Study shows that patients who have poly pharmacy tend to have less medication adherence but those with higher education level, higher quality of life and higher health status have more tendencies towards higher medication adherence.<sup>7</sup> A study shows that adherence to COPD medication regimens was poor and it was associated with age, current smoking status, number of respiratory drugs, number of daily respiratory drug doses and quality of life. Quality-of-life monitoring within clinical practice settings could facilitate improved medication adherence.<sup>8</sup>

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Health-related quality of life (HRQOL) reflects the health- and disease-related facets of quality of life. It is essential for examining the limitations and progression of the disease over time and may support monitoring of treatment.<sup>9</sup> Both general and disease-specific instruments have been used to measure quality of life in patients with COPD. Among the disease-specific questionnaires, St. George's Respiratory Questionnaire (SGRQ) is a frequently used tool to evaluate the HRQOL of COPD patients.<sup>10</sup>

## METHOD

A descriptive cross sectional study was done among known case of COPD cases in Manipal Teaching Hospital, Pokhara to assess the medication adherence and health related quality of life. A proposal was sent to Nepal Health Research Council for approval including ethical clearance. The concerned authority i.e, Manipal Teaching Hospital and Om Hospital and Research Center, Pokhara was briefed about the objective, process and importance of the study and formal administrative approval was taken for data collection.

Known case of COPD who are currently under medication prescribed by clinicians regardless of duration of disease and prescription and other co-morbidities were included in this study while those who are currently not under medication and those patients who refuse to participate in the study and who are mentally ill will be excluded from the study. After selecting the cases as per Inclusion criteria, the research instrument consisting of three parts was used to assess medicine adherence and Health related Quality Of Life (HrQOL).

Part I: Semi-structured questionnaire related to socio-demographic information, disease related information and co-morbidity. It was developed by the researchers through extensive literature review and consists of residence, age, sex, education status, monthly income, financial support, other co-morbidities, duration of study.

Part II: Standard tool Morisky medication adherence scale (MMAS-8) was used to assess medication adherence and as per the score each patient's medicine adherence was categorized as good, medium and bad.

Part III: standard tool St. George's respiratory questionnaire for COPD (SGRQ-C), was used which has been adapted and validated for use in Nepal and as per patient's score three aspect of HrQOL was analysed i.e impact on symptoms, limitations of activities, impact on disease and overall HrQOL of patient . In all the three aspects and overall HrQOL using percent of total score of patient's QOL was categorized as mild limitation, moderate limitation, severe limitation.

## Sample size

Prevalence of Adherence to medicine (p) = 65.9 %<sup>11</sup>

Sample size when estimating a proportion  $n = Z\alpha^2 pq/e^2$   
 $n$  = required sample size

$Z\alpha/2$  = the value of standard normal variate at desired level of confidence = 95 %

$e$  = allowable error = 5%

$p$  = proportion of required characteristics = 65.9 %

$q = 1-p$  Sample size ( $n$ ) =  $(Z\alpha/2 p q)/d^2$

=  $1.96 \times 1.96 \times 0.659 \times 0.341 / 0.05 \times 0.05$

= 345.31 = 345

Total sample size = 345

Data was collected by interviewing the respondents by the researchers themselves. Prior to data collection, written informed consent was taken with information about the nature of the study and their role in research. Precaution was taken throughout the study to safeguard the rights and welfare of the respondents. The respondents were given full authority to withdraw from the study without fear or explanation any time during data collection. After collecting data each questionnaire was given code number during data entry to maintain respondent's confidentiality. Obtained data was used for research purpose only. Collected data was checked, organized, coded and entered in SPSS version 25 for analysis. The data was analyzed by using descriptive statistics such as frequencies, percentage, mean and standard deviation and inferential statistics i.e. Chi square was done to find out the association using p-value and Phi value.

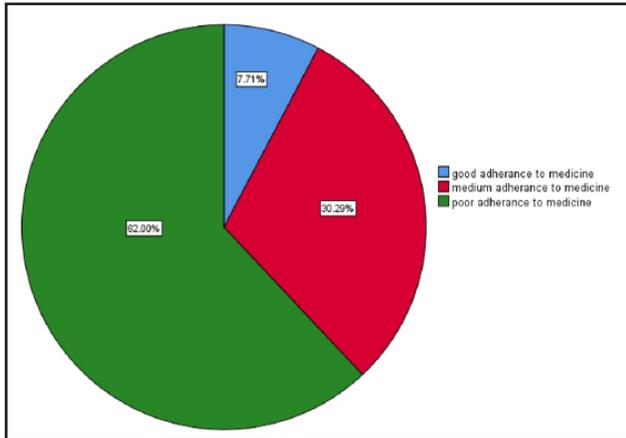
## RESULTS

This study comprises 350 COPD cases with 184 patients residing in urban areas and 166 patients

Table 1. Epidemiological variables and its association with medicine adherence.					
Variables	Adherence			Chi-square	p-value
	Good	Medium	Poor		
Residence					
Urban	22(12%)	66(35.9%)	96(52.2%)	19.086	0.001
Rural	5(3%)	40(24.1%)	121(72.9%)		
Sex					
Male	15 (9.4%)	44 (27.5%)	101 (63.1%)	1.869	0.393
Female	12 (6.3%)	62 (32.6%)	116 (61.1%)		
Ethnicity					
Hindu	14(6.60)	66(31.13)	132(31.13)	7.718	0.659
Buddhist	4(8.51)	18(38.30)	25(38.30)		
Kirat	1(6.25)	3(18.75)	12(18.75)		
Muslim	5(12.20)	10(24.39)	26(24.39)		
Ishai	3(14.29)	6(28.57)	12(28.57)		
Others	0(0.00)	3(23.08)	10(23.08)		
Marital status					
Married	22(9.32)	70(29.66)	144(29.66)	7.813	0.452
Unmarried	1(10.00)	1(10.00)	8(10.00)		
Separated	0(0.00)	1(100.00)	0(100.00)		
Divorced	0(0.00)	6(33.33)	12(33.33)		
Widow/widower	4(4.71)	28(32.94)	53(32.94)		
Education					
Illiterate	3(4)	19)	53(25.33)	30.506	0.001
Below primary	1(1)	20)	64(23.53)		
Primary education	6(7)	25)	50(30.86)		
SLC	13(15)	35)	37(41.18)		
Bachelors	4(18)	7)	11(31.82)		
Masters	-	-	2(0.00)		
Monthly income per year					
< 1000	2(2.50)	18(22.50)	60(22.50)	54.76	0.001
1000-4999	3(2.59)	28(24.14)	85(24.14)		
5000-9999	7(8.24)	25(29.41)	53(29.41)		
> 10000	15(21.74)	35(50.72)	19(50.72)		
Family type					
Nuclear	5(4.67)	29(27.10)	73(27.10)	9.66	0.046
Joint	19(10.61)	62(34.64)	98(34.64)		
Extended	3(4.69)	15(23.44)	46(23.44)		
Financial support					
Yes	20(11.63)	69(40.12)	83(40.12)	27.81	<0.001
No	7(3.93)	37(20.79)	134(20.79)		
Co morbidities					
Yes	15(8.24)	62(34.07)	105(34.07)	3.061	0.216
No	12(7.14)	44(26.19)	112(26.19)		
Duration of disease					
<1 year	18(30.51)	23(38.98)	18(38.98)	91.073	0.51
1-5 years	6(6.00)	25(25.00)	69(25.00)		
6-10 years	2(1.94)	13(12.62)	88(12.62)		
>10 years	1(1.89)	10(18.87)	42(18.87)		
Regular check up					
Yes	26(13.68)	81(42.63)	83(42.63)	62.608	<0.001
No	1(0.63)	25(15.63)	134(15.63)		

residing in rural with mean age of 72.06 years of COPD cases and patients age ranging from 49 to 94 years. This study contains 160 male and 190 females with mean age of male and female as 72.03 years and 72.08 years. Among 350 cases, 164(46.85%) resides in rural places of Nepal where as 186(53.15%) resides in urban areas. Among 350 cases analyzed, major population i.e. (n = 217; 62%) had poor adherence to medicine as illustrated in the figure 1.

Various socio-economic factors were associated with quality of medicine adherence among patients as presented in Table 1. There is positive association



**Figure 1. Medicine adherence of COPD cases as per morrisky scale.**

between education quality and medicine adherence where more literate patients had comparatively better medicine adherence than illiterate (p-value < 0.05; Chi square = 30.506; Phi = 0.295). There was also positive association between monthly income and medicine adherence where patient having lesser monthly income had poor medicine adherence in comparison to patients having greater monthly income (p-value = 0.000; Chi square = 54.76; Phi = 0.396). Similarly, patients with financial support (p-value = 0.000; Chi square = 27.81; Phi = 0.282), extended family (p-value = 0.046; Chi square = 9.66; Phi = 0.166 ), duration of disease < 5 years (p-value

<0.05 ; Chi square = 91.073 ; Phi = 0.510) and having regular follow up or check up (p-value = 0.000; Chi square = 62.608; Phi = 0.423) had good medicine adherence in comparison to patient without financial support, nuclear family, duration of disease > 5 years and without regular follow up as shown in Table 1.

There was also positive association between medicine adherence and current medical condition where patient with good adherence to medicine had good subjective feeling of current medical condition in comparison to patients with poor medicine adherence (p-value < 0.001; Chi square = 68.676) as shown in detail in Table 2.

There was positive association between medicine adherence and quality of life ( QOL) where patients having good medicine adherence had mild limitations on symptoms (p < 0.001; Phi = 0.609 ), mild limitation on activities (p-value < 0.001; Phi value = 0.488 ) in comparison to patients having poor medicine adherence as shown in detail in Table 3.

Similarly patients with good medicine adherence also had milder impact on disease (p-value < 0.00; Phi = 0.424) and mild limitation in overall quality o f life (QOL)(p-value < 0.001; Phi = 0.501) in comparison to patients with medium and poor medicine adherence as shown in detail in Table 4.

## DISCUSSION

The study comprises 350 COPD cases, majority of these cases (n= 217, 62%) had poor medicine adherence which was similar to the study done by Bhattarai et at, Jansen et al et al, Tabyshova et al, Humenberger et al, Zucchelli et al.<sup>12-16</sup>

There was positive association between place of residency and medicine adherence, where people residing in rural area had poor adherence to medicine in comparison to urban areas (72.9% v/s 52.2%) with p value < 0.001 and phi value 0.234. This is

**Table 2. Cross tab of medicine adherence and subjective current medical condition.**

Medicine adherence	Current medical condition					Chi-square	p-value
	Very good	Good	Fair	Poor	Very poor		
Good	18 (66.7%)	3 (11.1 %)	4(14.8%)	2(7.4%)	-	68.676	p< 0.001
Medium	48 (45.3%)	30(28.3%)	17(16%)	8(7.5%)	3 (2.8%)		
Poor	29 (13.4%)	56(28%)	73(33.6%)	39(18%)	20 (9.2%)		

<b>Table 3. Cross tab of Medicine adherence and different aspect of QOL (effects on symptoms and Limitation on activities).</b>				
Variables	Adherence			p-value
	Good n(%)	Medium n(%)	Poor n(%)	
<b>Effect on symptoms</b>				
Mild limitation	6(22)	3(2.8)	-	p < 0.001 Phi = 0.609
Moderate limitation	15(55.6)	68(64.2)	45(20.7)	
Severe limitation	5(18.5)	34(32.1)	106 (48.8)	
Very severe limitation	1(3.7)	1(0.9)	66 (30.4)	
<b>Limitation on activities</b>				
Mild limitation	20(74.1)	62(58.5)	35(16.1)	p < 0.001 Phi = 0.488
Moderate limitation	4(14.8)	29(27.4)	90(41.5)	
Severe limitation	3(11.1)	13(12.3)	66(30.4)	
Very severe limitation	-	2(1.9)	26(12.0)	

<b>Table 4. Cross tab of Medicine adherence and different aspect of QOL (impact on disease and overall quality of life).</b>				
Variables	Adherence			p-value
	Good n(%)	Medium n(%)	Poor n(%)	
<b>Impact on disease</b>				
Mild limitation	17(63%)	64(60.4%)	42(19.4%)	p < 0.001 Phi = 0.424
Moderate limitation	7(25.9%)	68(64.2%)	45(20.7%)	
Severe limitation	5(18.5%)	33(31.1%)	138 (63.6%)	
Very severe limitation	3(11.1%)	9(8.5%)	37 (17.1%)	
<b>Overall quality of life</b>				
Mild limitation	-	-	-	p < 0.001 Phi = 0.501
Moderate limitation	20(74.1%)	69(65.1%)	41(18.9%)	
Severe limitation	7(25.9%)	32(30.2%)	117(53.9%)	
Very severe limitation	-	5(4.7%)	59(47.2%)	

<b>Table 5. Patient residency and its impact on education status and regular follow up.</b>			
Variables	Residence		p-value
	Urban n(%)	Rural n(%)	
<b>Education status</b>			
Illiterate	36(19.6)	39(23.5)	p-value = 0.002; phi = 0.233
Below primary	35(19)	50(30.1)	
SLC	56(30.4)	41(24.7)	
Bachelors	17(9.2)	29(17.5)	
Masters	-	-	
<b>Regular follow up</b>			
Yes	130(70.7)	60(36.1)	p-value = 0.000; phi = 0.346
No	54(29.3)	106(63.9)	

new finding and making this study a unique in its own where people residence had significant role in medicine adherence. This study also explores the possible association between residence of COPD patients and education status which shows patients residing in rural areas had less education qualification

in comparison to patients residing in urban areas ( p value 0.002 and phi = 0.233) as shown in Table 5. It can also be explained by the association between residence of patient and regular follow up where patients residing in rural areas had comparatively less regular follow up than patients residing in urban areas as shown in Table 5. The possible explanation for this finding may be due to less availability of medical service in rural areas which requires to be explored further in different study.

This study also finds positive association between types of family and medicine adherence i.e. poor medicine adherence was seen among cases having nuclear family in comparison to patient having extended family in low-middle income country like Nepal (p value < 0.05). This is a new finding and requires further study.

Other factors that was associated with poor medicine adherence were poor education status, low monthly

income, no financial support, no regular follow up, nuclear family time and longer duration of disease (> 5 years and > 10 years) as shown in detail in Table 1 and explained in result section. This finding was similar to study done by Tabyshova et al, Horvat et al which shows positive association between education level and medicine adherence.<sup>14,17</sup> Similarly the positive association with monthly income, financial support and medicine adherence which was similar to study done by Tabyshova et al, Bourbaeu et al, Otoole et al.<sup>14, 18, 19</sup> Thus, education status, financial support, residence of patient were a factor which determine medicine adherence among COPD patient. Proper counseling may be way to improve medicine adherence among patients with low education and financial status and people residing in rural areas. There was no association between presence of other co-morbidities and medicine adherence for COPD patients (p value > 0.05). This was similar to study done by Federman et al, Dhamane et al which also shown no association between presence of other co-morbidities, poly pharmacy and medicine adherence among COPD patients.<sup>20,21</sup> However, study done by Moradkhani et al, Ierodiakonou et al, Rogliani et al shows positive association between presence of co-morbidities and medicine adherence among COPD patients, with poor medicine adherence among cases with presence of other co-morbidities as well. Thus, this dual finding needs further confirmation with multi-centric evaluation.<sup>22-24</sup> On evaluating medicine adherence and its impact on various aspect of quality of life shows, positive association between medicine adherence and various aspect of quality of life such as effect on symptoms, limitation of activities, impact on disease and overall quality of life ( P < 0.001) in each of the aspects of quality of life. This finding was similar to the study done by Moradkhani et al, Lopez-pintor et al, Helvaci et al, Polanski t al, Mohsen et al.<sup>22, 25-28</sup> However, this finding was not supported and differs from the study done by Horvet et al, Mohsen et al, Agh et al, Boland et al, Agh et al, Wu et al, which states medicine adherence don't effect quality of life.<sup>17,28- 32</sup> Thus, further study is required to confirm the association between medicine adherence

and quality of life among COPD patients various confounding factor that ma effect these findings.

## CONCLUSION

The majority of cases in this study exhibited poor medication adherence, which was more commonly observed in patients with certain socio-demographic and health-related characteristics. Specifically, poor adherence was strongly associated with factors such as living in rural areas, having a lower level of education, earning a low monthly income, lacking financial support, experiencing a longer duration of illness, coming from a nuclear family structure, and failing to follow up regularly with clinicians. Interestingly, no statistically significant relationship was found between medication adherence and the presence of other co-morbidities. Additionally, patients who demonstrated poor adherence to their medication regimen reported significantly worse health-related quality of life (HrQOL) across multiple domains. These patients experienced a severe impact on their symptoms, considerable limitations in daily activities, a higher burden of disease, and an overall reduction in their quality of life. This highlights the significant negative consequences of poor medication adherence on both physical health and overall well-being.

## Limitation:

This study doesn't focus on psychological aspect of patient and its effect on medicine consumption. Multi-centric study to strengthen evidence for controversial findings such as effect of co-morbidities on medicine adherence.

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