



## Medication Adherence of Patients with Neurological Conditions in the Era of COVID-19 Pandemic: Is there an Impact?

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### Abstract

**Background:** Strategies implemented around the globe to face COVID-19 pandemic raised some challenges in ensuring care continuity and might have impacted Patient Medication adherence which is crucial for patients with chronic neurologic diseases.

**Methods:** We conducted a descriptive cross-sectional study with a total of 83 patients with chronic neurological conditions. Data was collected through a directed questionnaire using Medication Adherence Reasons Scale. We have also compared levels of treatment adherence according to sociodemographic characteristics. To our knowledge, this is the first study conducted in Morocco aiming to assess patient medication adherence in Neurology.

**Results:** The mean age in our study was  $55,4 \pm 19,2$ , Women represented 44,6%. Our study found 59% of nonadherence versus 41% of full medication adherence. The main reported reasons for treatment discontinuation were the patient's inability to ride to the pharmacy (24.5%), financial reasons (22.4%), social reasons (20.4%), side effects occurrence (16.3%), perception of the medication as unnecessary or ineffective (both 14,3 %). We found a correlation between socio-economic level and medication adherence ( $p = 0.023$ ). Interestingly, COVID-19 pandemic was cited as the main factor standing behind 18 patients answers.

World Health Organization estimates overall poor adherence to 50%, our results were even higher. Noteworthy, the correlation highlighted between socio-economic level and medication adherence could be the reflection of a growing socio-economic divide. Furthermore, COVID-19 pandemic might be an aggravating factor of nonadherence probably because of the difficult access to healthcare facilities, lockdown, overall context of anxiety, economic impact of the outbreak, and possible shortage in drugs.

**Conclusion:** The already poor observance highlighted by our study will probably worsen after COVID-19 pandemic and its expected impact on national economy.

**Keywords:** COVID-19 Pandemic; SARS-COV 2; Patient Medication Adherence; Neurology; Low-Middle Income Countries

### Introduction

SARS COV2 outbreak evolved rapidly since the first human cases described in Wuhan – China in December 2019 to a global pandemic threatening health and economic conditions and straining national health systems all around the world. The fast measures deployed by different countries and their health structures including barrier measures, physical distancing, and people lockdown helped significantly to reduce the risk of SARS COV2 spread. In Morocco, rapid measures of containment have been applied between March and June 2020 with border closure, schools closing, strict population lockdown where all nonessential movement was prohibited, intercity transportation was suspended and residents only

allowed to leave their homes to shop for food and medicine, or to go to work with the required permits issued by authorities.

However, these epidemiological strategies raised some corollary consequences such as patients avoiding intentionally health structures or experiencing difficulties to access health care facilities which led to additional challenges in ensuring care continuity especially for patients with chronic diseases. In many medical specialties such as neurology, care continuity and medication adherence are the pillars for effective therapeutic management particularly for -among others- chronic cerebrovascular diseases, epilepsy, inflammatory diseases of the brain and spinal cord or movement disorders.

Subsequently, we aimed to quantify the medication adherence of our chronic patients, explore the causes of possible nonadherence to the pharmacological treatment and assess the potential impact of COVID-19 context on the therapeutic observance.

**Methods**

A descriptive cross-sectional study aiming to evaluate medication adherence of a sample of patients in Neurology during the SARS-COV-2 pandemic, was carried out during April 2020 within the Neurology department of Cheikh Khalifa ibn Zayed University Hospital in Casablanca - Morocco. A total of 100 patients with chronic neurological conditions and with a minimum of three months follow up were selected.

All chronic neurological pathologies were included (cognitive pathologies; neuromuscular impairment; epilepsy, inflammatory diseases of the brain and spinal cord, movement disorders, and chronic headaches), all patients had pharmacological treatment for

at least 6 months. Data was collected through a directed questionnaire administered by telephone and including four sections.

First section : Study summary and consent requirement

All patients included in this study gave explicitly their consent before proceeding to the survey. The questionnaire was answered by the next of kin in case of patient disability (i.e. dementia).

Second section: Socio-demographic and neurological disease information

Age, gender, socio-economic level, and type of chronic neurological pathology was reported into this section. The socio-economic level was categorized based on the respondent self-assessment to either Low; middle or High Socio-economic level.

Third section: Medication adherence level (Table 1)

Item 1: Over the last 7 days, how many were you able to take your medicine exactly as prescribed?			
0 Day			
1 Day			
2 Days			
3 Days			
4 Days			
5 Days			
6 Days			
7 Days			
When you were not able to take your (specific) medicine as prescribed, how many days did it happen for each of the following reason?			
Item 2	I had side-effects from this medicine	Yes	No
Item 3	I did not have money to pay for this medicine	Yes	No
Item 4	I was not comfortable taking it for personal reasons (e.g., I was traveling)	Yes	No
Item 5	I was not comfortable taking it for social reasons (e.g., I was with friends)	Yes	No
Item 6	I don't think that I need this medicine anymore	Yes	No
Item 7	I don't think that this medicine is working for me	Yes	No
Item 8	I sometimes skip this medicine to see if it is still needed	Yes	No
Item 9	I am concerned about possible side-effects from this medicine	Yes	No
Item 10	I am concerned about long-term effects from this medicine	Yes	No
Item 11	I had difficulty opening the container	Yes	No
Item 12	I had difficulty swallowing this medicine	Yes	No
Item 13	I don't have the medicine because the pharmacy was out of this medicine	Yes	No
Item 14	I don't have the medicine because I don't have a ride to the pharmacy	Yes	No
Item 15	I am not sure how to take this medicine	Yes	No
Item 16	I have trouble managing all the medicines I have to take	Yes	No
Item 17	I would have taken it but simply missed it	Yes	No
Item 18	I would have taken it but missed it because of busy schedule	Yes	No
Item 19	I would have taken it but have problems forgetting things in my daily life	Yes	No
Item 20	I do not consider taking this medicine as a high priority in my daily routine	Yes	No

**Table 1:** Medication Adherence Reasons Scale (MAR-Scale) with 20 items.

We used a Medication Adherence Reasons Scale (MAR-Scale) which is a 20-item comprehensive scale that was developed to measure medication adherence [1]. This scale has one item that evaluates the overall nonadherence and 19 items of recurrently cited reasons for nonadherence. The first item uses an 8-point scale from 0 to 7 days and is built on a key question “How many days were you able to take your medication for a specific cause?”. Zero days represents complete nonadherence, any day from 1 to 6 represents partial nonadherence and 7 days represents perfect adherence. As the aim of our research was to explore the common reasons for possible nonadherence, the 19 items were used on a Yes/No scale rather than the eight-item 0–7 days scale. The MAR-Scale questionnaire was translated into local dialectic language.

Fourth section: Exploratory section

The MAR-Scale used covers an inclusive, comprehensive breadth of possible reasons for medication nonadherence. However, other socio-psychological reasons could interfere with the adherence specifically in the context of the pandemic era. Thus, patients were asked to specify their answers in case they answered “yes” to items involving general reasons like personal reasons for item number 4 (I was not comfortable taking it for personal reasons), social reasons for item number 5 (I was not comfortable taking it for social reasons) or the reason behind the inability to ride to the pharmacy for item number 14.

Statistical analysis of the data was carried out using SPSS software version 16.0. We present the mean and standard deviation for continuous variables and frequencies for categorical variables. Chi-square test was used to compare levels of treatment adherence according to sociodemographic characteristics; however, patients were pooled due to the low number of low social status patients. The level of statistical significance was set at 5%.

**Results**

Out of 100 patients selected, we included 83 eligible patients while 17 patients were excluded from the study either because they did not give explicitly their consent or were not reachable on the contact details they provided at admission. The mean age in our study was 55,4 ± 19.2 with values ranging from 16 to 88 years old. Women represented 44,6% (n = 37). Table 2 summarizes the socio-economic and clinical characteristics of our sample.

On the medication adherence per se, 59% of the patients reported nonadherence to the prescribed pharmacological treatment

(including 53% of partial nonadherence and 6% of complete non-adherence) versus 41% of the patients in our sample who had a full medication adherence.

		N	%
Gender	Female	37	44,6
	Male	46	55,4
Marital status	Married	62	74,7
	Single	14	16,9
	Widowed	6	7,2
	Divorced	1	1,2
Socio-economic status	High	18	21,7
	Middle	59	71,1
	Low	6	7,2
Neurologic disorders	Cerebrovascular Disease	21	25,3
	Epilepsia	16	19,3
	Chronic headache	15	18,1
	Peripheral Neuropathy	12	14,5
	Movements Disorders	8	9,6
	Dementia	6	7,2
	Inflammatory disorders	5	6

**Table 2:** Sociodemographic and clinical characteristics of the study sample (n = 83).

In our survey, the main reported reasons for treatment discontinuation in the group of non-adherents were the patient’s inability to ride to the pharmacy in 24.5% of the cases followed by the financial incapacity to buy medication which was reported by 22.4% of the survey participants. The other mentioned reasons were social reasons and side effects occurrence in 20.4% and 16.3% of the cases respectively. Furthermore, the pharmacological treatment was perceived as unnecessary or ineffective equally in 14,3 % of the cases. Table 3 details the reasons for medication partial or full nonadherence.

Interestingly, the COVID-19 pandemic was cited by 18 patients as the main factor standing behind some of their answers. Indeed, 11 patients reported their fear from SARS-COV2 contamination when answering item 14 (I didn’t have the medicine because I didn’t have a ride to the pharmacy), 4 participants mentioned the economic impact of COVID-19 pandemic as the direct cause to item 3 (I did not have money to pay for this medicine) while 3 patients associated COVID-19 outbreak to item 5 (I was not comfortable taking it for social reasons).

Item	N	%
I didn't have the medicine because I didn't have a ride to the pharmacy	12	24,5
I did not have money to pay for this medicine	11	22,4
I was not comfortable taking it for social reasons (e.g., I was with friends)	10	20,4
I had side-effects from this medicine	8	16,3
I don't think that I need this medicine anymore	7	14,3
I don't think that this medicine is working for me	7	14,3
I am concerned about possible side-effects from this medicine	5	10,2
I didn't have the medicine because the pharmacy was out of this medicine	5	10,2
I sometimes skip this medicine to see if it is still needed	2	4,1
I was not comfortable taking it for personal reasons (e.g., I was travelling)	1	2,0
I am concerned about long-term effects from this medicine	1	2,0
I have trouble managing all the medicines I have to take	1	2,0
I would have taken it but simply missed it	1	2,0
I would have taken it but have problems forgetting things in my daily life	1	2,0
I had difficulty opening the container	0	0,0
I had difficulty swallowing this medicine	0	0,0
I am not sure how to take this medicine	0	0,0
I would have taken it but missed it because of busy schedule	0	0,0
I do not consider taking this medicine as a high priority in my daily routine	0	0,0

**Table 3:** Frequencies of the different reasons for nonadherence in the study sample (Nonadherence or incomplete adherence).

Our study did not find a correlation between gender, age, marital status, and patients medication compliance. However, a correlation was found between the socio-economic level and medication adherence ( $p = 0.023$ ) (Table 4).

		Complete adherence		Incomplete adherence		P value (Chi-Square Test)
		N	%	N	%	
Age	<60	17	45,9	20	54,1	0,690
	≥60	17	41,5	24	58,5	
Gender	Female	13	38,2	21	61,8	0,402
	Male	21	47,7	23	52,3	
Marital Status	Married	24	42,1	33	57,9	0,663
	Others	10	47,6	11	52,4	
Socio-economic level	High	11	68,8	5	31,3	0,023
	Low-Middle	23	37,1	39	62,9	

**Table 4:** Association of sociodemographic factors and therapeutic adherence (n = 78).

### Discussion

Despite the factual increase in neurological diseases and the crucial exacerbation of the problem of nonadherence [2], only a few data about neurological patient's therapeutic adherence are available [2,3]. World Health Organization (WHO) estimates that 50% of patients adhere poorly to their treatment in the overall [4], the results of our sample are even higher than these estimations.

Noteworthy, therapeutic adherence remains a difficult concept to assess and quantify even if several direct or indirect methods were created, tested, and approved [5]. In our work, we used a MAR-Scale questionnaire (built on 20 items to which the patient could respond with yes/no) given its ease of use, its simplicity to adapt in our local context but - above all- given the behavioral dimension that this questionnaire is able to explore and assess [6]. Indeed, medication adherence is not an "all or nothing phenomenon", there is a nuance between total compliance, omissions in medication, errors in dosage or treatment schedule, partial refusal and finally complete refusal of the prescribed treatment. Subsequently, compliance can be zero, partial, or total. It is a dynamic

process that can evolve towards improvement or on the contrary towards a deterioration over time according to various influencing factors [7].

Hence, the identification of the reasons for therapeutic nonadherence is the cornerstone for efficient neurological care especially for patients with chronic neurological disorders. In our study, the inability to go to the pharmacy to get the treatment, the lack of financial means, the social reasons, the undesirable effects of the treatments, the patient's perception of the treatment as unnecessary or ineffective were the most prominent reasons for nonadherence, other studies found similar results [8].

Furthermore, the positive correlation highlighted in our sample between socio-economic level and medication adherence could be seen as the reflection of a growing socio-economic divide and inequalities to healthcare access. Indeed, People of higher socio-economic status are more likely to have better access to good quality healthcare, health information, and costly medicines for chronic diseases than people of lower socioeconomic status [9,10]. However, larger and multicentric sample is necessary to confirm this finding as in our study, middle and low social status patients were pooled due to the low number of low social status patients in our case.

Interestingly, even though the MAR Scale we have used does not permit to take into consideration the underlying motivations standing behind the predefined reasons or items in the questionnaire, it appears that COVID-19 pandemic could be an aggravating factor of nonadherence as 18 patients of 83 cited the SARS-COV2 outbreak as a motivation for nonadherence mainly in the following reasons: inability to go to the pharmacy to get the treatment, the lack of financial means and social reasons. This finding could be explained in a more than a way:

- Difficulties to access healthcare structures including pharmacies due to lockdown and social distancing measures and even blockage in certain regions to help contain the spread of the virus [11,12].
- The context of stress and anxiety during crisis situations for chronic patients during COVID-19 pandemic [13,14].
- The economic impact of COVID-19 pandemic; indeed, national economies around the globe would hardly escape its disastrous economic repercussions. Macroeconomic aggregates showed markedly declining forecast levels which, probably, will remain subject to further deterioration in the future [15-17].

- Issues of drugs and raw material shortage due to the pandemic and its consequences [11,18,19], a point which might have impacted directly the therapeutic adherence.

## Conclusion

Patient medication nonadherence remains a serious issue in the management of chronic patients, as more than the half of our patients are poorly compliant with the prescribed pharmacological treatment. Unfortunately, these -already low - levels of medication adherence will probably worsens in the future at a time when COVID-19 related deaths exceeded 1,5 million worldwide and where health systems particularly in lower and middle-income countries are challenged due to the effect that this pandemic has on the already fragile health systems, on another hand, medication adherence will also probably suffer from the expected negative economic impact of COVID-19 especially among patient with low/middle socio-economic level.

## Competing Interests

The authors declare no competing interest.

## Authors' Contributions

- Asmaa HAZIM Affiliation: Mohamed VI University of Health Sciences, Faculty of Medicine, Department of Neurology; Casablanca/Morocco.
- Contribution: Author; Corresponding Author; Design and conceptualization; data collection and analysis; writing, drafted the manuscript.
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- Contribution: Co-Author; Data analysis, writing and revision of manuscript.
- Houda GUENNOUNI ASSIMI, Affiliation: Mohamed VI University of Health Sciences, Faculty of Medicine Casablanca/Morocco
- Contribution: Data collection and revision of manuscript.

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## Ethical Statement

Not applicable/required.

Survey conducted with explicit consent of the participants.



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