

# Adherence to Physical Measures during the SARS-COV2 Pandemic by Haemodialysis Patients in a Burkina Faso Tertiary Hospital: A Cross-Sectional Survey

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## Abstract

**Context:** COVID-19 can spread rapidly in haemodialysis centres, leading to fatal outcomes. Implementing physical measures is crucial in limiting the spread of infection. **Aims:** To assess adherence to physical measures against SARS-Cov2 in haemodialysis patients. **Methods and Material:** From 13 to 19 July 2021, we administered the questionnaire to haemodialysis patients during or immediately after the dialysis session. The dependent variables were adherence to wearing masks, hand washing outside the dialysis centre, social distancing of at least 1.5 meters, and cough and sneeze hygiene. **Statistical Analysis Used:** Data were analyzed using Epi info software; descriptive statistics were presented as mean, headcount, and percentage; related factors were determined by multi-logistic regression. The significance level was 5%. The Health Research Ethics Committee approved the research protocol. **Results:** 142 patients were included (mean age:  $42.5 \pm 14$  years). Wearing masks, hand-washing, social distancing, and coughing and sneezing hygiene were observed by 88%, 75%, 47%, and 60% of patients, respectively. **Conclusion:** Wearing masks was the most respected physical measure, while social distancing was the least respected.

## Keywords

Physical Measures, COVID-19, Haemodialysis, SARS-COV2, Tertiary Hospital,

## 1. Introduction

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Cov2) infection is highly contagious [1]-[3] and fatal in patients with end-stage renal disease (ESRD), with a mortality rate of around 30% [4]-[7]. Centre-haemodialysis patients have a high risk of contagion due to close contact between patients and between patients and staff during sessions and their recurrent physical presence in the centre [8]. Physical measures and vaccination are the means of preventing SARS-Cov2 infection [9]. The effectiveness of physical measures in preventing respiratory diseases has been established by several studies in the general population, even though their levels of evidence are not high [10] [11]. This is particularly important because patients with ESRD have a weak response to vaccination, requiring several doses to achieve strong immunity [12]. At the start of the epidemic, before vaccines were available, the World Health Organization (WHO) recommended the following measures: hand washing with soap and water or hand sanitizing, wearing a face mask, and social distancing [13]. Implementing these measures in haemodialysis centres was challenging because of staff reductions, shortages of personal protective equipment, face masks and hydro-alcoholic solutions for hand hygiene [14]-[16]. In Sub-Saharan Africa, there is low adherence to physical measures despite good knowledge of the risks associated with COVID-19 [17]. To our knowledge, there are no published studies on adherence to physical measures in hemodialysis patients in Sub-Saharan Africa. However, given the high mortality rate of COVID-19 among hemodialysis patients, we hypothesized that there would be good adherence to physical measures. We are reporting the results of a cross-sectional survey to assess adherence to physical measures in a haemodialysis centre in Ouagadougou, Burkina Faso.

## 2. Patients and Methods

### 2.1. Study Framework and Sampling

Our survey was conducted from July 13<sup>th</sup> to July 19<sup>th</sup>, 2021, at a haemodialysis centre with 32 stations located in Yalgado Ouédraogo Teaching Hospital, the largest tertiary hospital in Burkina Faso. The sessions took place from Monday to Sunday, with most patients attending two four-hour weekly sessions per week. Patients infected with SARS-CoV-2 were dialysed together, followed by systematic disinfection by the hospital's hygiene department. The country implemented physical measures, city confinement, quarantine for cases, and vaccination during the study period. The study included all patients aged 18 years or older who had been receiving haemodialysis for stage 5 chronic kidney disease for more than three months. Patients who had COVID-19 at the time of the survey were

excluded. The sample size was not calculated because the aim was to include all patients who met the inclusion criteria.

## 2.2. Data Collection and Analysis

In this study, we focused on three main themes related to COVID-19 in haemodialysis patients at our centre: fear of COVID-19, adherence to physical measures, and vaccine hesitancy. After reviewing relevant literature, two nephrologists and a psychiatrist created the questionnaire used in the study. The questionnaire was initially tested with a small group of haemodialysis patients, and based on their feedback, the questions were refined for better clarity. However, the questionnaire's validity and reliability were not formally assessed. The survey contained questions about four physical measures: wearing face masks, hand washing, social distancing, and cough/sneeze hygiene. The validated final version of the questionnaire (attached in the appendix) was anonymously administered by Master II medical students after reaching a consensus between the three authors. The study gathered information on demographic characteristics, length of time on hemodialysis, COVID-19 vaccination status, performance of the COVID-19 test, confidence in COVID-19, and fear of COVID-19 using the Fear of COVID-19 Scale [18]. Data analysis was conducted using Epi-info software version 7.2.5.0. Descriptive statistics were reported as mean  $\pm$  standard deviation and relative and absolute frequencies for quantitative and categorical variables. A simple logistic regression was used to analyze associated factors with a significance threshold of 0.20. The odds ratios (OR) and their 95% confidence intervals were calculated and assessed using the Wald test. Variables with a statistically significant association were included in the multiple logistic regression model to eliminate confounding factors. The variables were eliminated step by step based on their p-values. The study was approved by the local Ethics Committee for Health Research (CRS no. 2021-04-108), and all participants provided oral consent, with all data kept anonymous.

## 3. Results

A total of 142 patients were involved in the study. Their mean age was 42.5 years, with a standard deviation of 14. Among the patients, the mean age was 42.7 years for men ( $n = 84$ ) and 42.2 years for women ( $n = 58$ ). Of the patients, 27% (38 out of 142) did not attend school. Concerning COVID-19, 100 out of 142 patients (70%) expressed confidence and were aware that haemodialysis patients faced a higher risk of developing severe COVID-19 compared to the general population. Additionally, 73 out of 142 patients (51.4%) had a level 1 fear of COVID-19. The general characteristics of the study population can be found in **Table 1**.

### 3.1. Percentages of Adherence to Physical Measures

Out of 142 haemodialysis patients at Yalgado Ouédraogo Teaching Hospital, 114 (80.3%) reported wearing face masks regularly, 107 (75.4%) stated that they

**Table 1.** General characteristics of haemodialysis patients at Yalgago Ouedraogo Teaching Hospital of Ouagadougou; Burkina Faso (n = 142).

Variables	Count	Percentage (%)
<b>Sex</b>		
Men	84	59.2
Women	58	40.8
<b>Education level</b>		
Not enrolled	38	26.8
Primary	24	16.9
Post-primary	22	15.5
Secondary	27	19
Tertiary	31	21.8
<b>COVID-19 test<sup>£</sup></b>	129	90.8
<b>Confidence in COVID-19<sup>¥</sup></b>	100	70.4
<b>COVID-19 vaccination<sup>§</sup></b>	9	6.3
<b>Dialysis patients are at risk of severe COVID-19</b>	100	70.4
<b>Fear of COVID-19 level</b>		
Level 1	73	51.4
Level2	50	35.2
Level 3	18	12.7
Level 4	1	0.7

£: have had at least one rt-PCR or antigen test for SARS-CoV2; ¥: HD believing in the existence of the SARS-CoV2 epidemic. §: HD vaccinated against SARS-COV2 infection.

washed their hands outside the dialysis centre, 85 (59.9%) mentioned coughing and sneezing into the bend of their elbows, and 67 (47.2%) indicated that they respected a social distance of at least 1.5 meters.

### 3.2. Factors Associated to Adherence to Physique Measures

#### Wearing face masks

In both univariate and multivariate analysis, the factors associated with adherence to wearing face masks were primary education level (ORa: 4.34; CI 95%: 1.17 - 16.11; p = 0.03) and confidence in COVID-19 (ORa: 0.25; CI 95%: 0.10 - 0.64; p = 0.0038). The analysis results for factors associated with adherence to wearing face masks are displayed in **Table 2**.

#### Hand washing

In multivariate analysis, no variable was statistically associated with washing hands regularly outside the haemodialysis centre.

#### Social distancing

In univariate analysis, tertiary education level (p = 0.002), confidence in

**Table 2.** Factors related to adherence to the wearing face masks by haemodialysis patients at Yalgado Ouédraogo Teaching Hospital of Ouagadougou; Burkina Faso (n = 142).

Variables	Univariate Analysis		Multivariate Analysis	
	OR (CI 95%)	p-value	ORa (CI 95%)	P-value
<b>Education level</b>				
Not enrolled	ref		ref	-
Primary	3.96 [1.1; 13.9]	0.0312	4.34 [1.2; 16.1]	0.03
Post-primary	0.3 [0.03; 2.9]	0.3059	0.41 [0.04; 3.9]	0.4
Secondary	1.50 [0.4; 5.8]	0.5566	1.27 [0.31; 5.14]	0.7
Tertiary	2.3 [0.7; 7.9]	0.1882	2.83 [0.77; 10.35]	0.1
<b>Confidence in COVID-19</b>				
No	ref		ref	
Yes	0.26 [0.11; 0.63]	0.0027	0.25 [0.1; 0.64]	0.0038
<b>Dialysis patients are at risk of severe COVID-19</b>				
No	ref	-	-	-
Yes	0.47 [0.2; 1.1]	0.0892	-	-
<b>Fear the COVID-19</b>				
Level 1	ref	ref	-	-
Level 2	0.46 [0.17; 1.20]	0.1136	-	-
Level 3	0.35 [0.07; 1.69]	0.1936	-	-
Level 4	0.00 [0.00; >10 <sup>12</sup> ]	0.9761	-	-

ref: reference; OR: Odds-ratio; ORa: Adjusted odds-ratio.

COVID-19 ( $p = 0.03$ ), and fear of COVID-19 level 3 ( $p = 0.02$ ) were statistically associated with adherence to social distancing. In multivariate analysis, COVID-19 vaccination status (ORa: 0.16; CI 95%: 0.03-0.84;  $p = 0.0306$ ) and fear of COVID-19 level 2 (ORa: 0.44; CI 95%: 0.20 - 0.94;  $P = 0.0340$ ) and level 3 (ORa: 0.24; CI 95%: 0.08 - 0.74;  $p = 0.0128$ ) were statistically associated with adherence to social distancing. The analysis results of the factors related to adherence to social distancing are presented in **Table 3**.

#### Coughing and sneezing hygiene

In univariate and multivariate analyses, only confidence in COVID-19 ( $p = 0.0028$ ) was statistically associated with adherence to cough and sneeze hygiene (ORa: 0.32; CI 95%: 0.15-0.69;  $p = 0.0036$ ). **Table 4** outlines the results of the analysis of factors related to adherence to coughing and sneezing hygiene adherence.

## 4. Discussion

The study aimed to evaluate adherence to four physical measures during the SARS-Cov2 pandemic among haemodialysis patients in a sub-Saharan African

**Table 3.** Factors related to adherence to social distancing by haemodialysis patients at the Yalgado Ouédraogo Teaching Hospital of Ouagadougou; Burkina Faso (n = 142).

Variables	Univariate Analysis		Multivariate Analysis	
	OR (CI 95%)	p-value	ORa (CI 95%)	p-value
<b>Education level</b>				
Primary/not enrolled	ref	-	-	-
Post-primary	1.38 [0.52; 3.67]	0.5135	-	-
Secondary	1.49 [0.6; 3.7]	0.3884	-	-
Tertiary	4.74 [1.7; 12.6]	0.0019	-	-
<b>Confidence in COVID-19</b>				
No	ref	-	-	-
Yes	0.44 [0.2; 0.9]	0.0341	-	-
<b>COVID-19 vaccination</b>				
Unvaccinated	ref	-	-	-
Vaccinate	0.23 [0.04; 1.2]	0.0774	0.16 [0.03; 0.84]	0.0306
<b>Fear of COVID-19</b>				
Level 1	ref	-	-	-
Level 2	0.5 [0.24; 1]	0.0633	0.44 [0.20; 0.94]	0.0340
Level 3	0.29 [0.1; 0.87]	0.0274	0.24 [0.08; 0.74]	0.0128
Level 4	0.00 [0.00; >10 <sup>12</sup> ]	0.9655	0.00 [0.00; >10 <sup>12</sup> ]	0.9650

ref: reference; OR: Odds- ratio; ORa: Adjusted Odds-ratio.

**Table 4.** Factors related to adherence to cough and sneeze hygiene adherence in haemodialysis at Yalgado Ouédraogo Teaching Hospital of Ouagadougou; Burkina Faso (n = 142).

Variables	Univariate Analysis		Multivariate Analysis	
	OR (IC <sub>95%</sub> )	P-value	ORa (IC <sub>95%</sub> )	p-value
<b>Diabetes</b>				
No	ref	-	-	-
Yes	0.15 [0.01; 1.2]	0.0768	0.15 [0.01; 1.3]	0.0873
<b>Confidence in COVID-19</b>				
No	ref	-	-	-
Yes	0.32 [0.15; 0.67]	0.0028	0.32 [0.15; 0.7]	0.0036
<b>Dialysis patients are at risk of severe COVID-19</b>				
No	ref	-	-	-
Yes	0.56 [0.27; 1.2]	0.1223	-	-

ref: reference; OR: Odds-ratio; ORa: Adjusted Odds-ratio.

country. The findings showed that 80% of haemodialysis patients reported wearing face masks, 75% regularly washed their hands outside the haemodialysis centre, 60% coughed and sneezed into their elbow, and 47% claimed to maintain a social distance of at least 1.5 meters. Primary education level was linked with not wearing a face mask, while confidence in COVID-19 increased the likelihood of wearing face masks. No variable was statistically linked with failure to wash hands regularly outside the haemodialysis centre. Being vaccinated against COVID-19 and fear of COVID-19 favoured adherence to social distancing, and confidence in COVID-19 favoured proper hygiene for coughing and sneezing.

#### **Wearing face masks**

The majority of haemodialysis patients (80.3%) reported that they wear face masks. While the effectiveness of face mask use in preventing SARS-Cov2 infection has been demonstrated [19], varying adherence rates have been observed in the general population. Joseph Kawuki *et al.* reported low adherence rates ranging from 20.3% to 59.4% in three African countries [20]. However, adherence rates of over 60% have also been reported globally [20]-[22]. Good adherence to mask-wearing has been reported in patients at risk of severe forms of COVID-19. In a multicenter study, Jazieh AR *et al.* reported 77% adherence among cancer patients [19]. In Ethiopia, 83% of patients with chronic diseases, including chronic kidney disease, adhered to face mask-wearing [20]. Factors for not wearing masks were the primary level of education and denial of COVID-19. Joseph Kawuki *et al.* also indicated that the level of education and perception of the benefits of wearing masks influenced adherence to mask-wearing [20]. Denial of COVID-19 was reported at a percentage ranging from 2.7% to 20.2% in a West African survey, with a rate of 10.7% in Burkina Faso in 2021 [21]. According to Zaildo *et al.*, certain beliefs hinder adherence to preventive measures against COVID-19 and other respiratory diseases, particularly in sub-Saharan African populations [22]. In our centre, patients were required to purchase their own face masks. Additionally, there were periods during the pandemic when face masks were in short supply. These circumstances may have led patients to only wear masks at the hemodialysis centre and use them less frequently outside of the centre, potentially reducing the effectiveness of mask-wearing in preventing the spread of the pandemic.

#### **Hand washing**

The study found a high adherence rate (75.35%) to this physical measure, although varying levels of handwashing adherence have been reported in Sub-Saharan Africa [20]. Some sub-Saharan African populations have reported less than 60% handwashing rates in COVID-19 [23]. On the other hand, individuals with cancer, diabetes mellitus, hypertension, or chronic kidney disease in Egypt, Algeria, Morocco, and Ethiopia have shown a high percentage of up to 90% adherence to handwashing [19] [20]. Limited water availability often hampers handwashing in this region. Although study study did not find any statistical association with handwashing, other studies have reported gender, education level, marital status,

occupation, and water source availability as influencing factors. This study's absence of associated factors could be due to its small sample size and the lack of investigation into water accessibility and types of water sources available in patients' living settings. While water points and soap were readily available in the dialysis centre during the study, the study did not examine the link between the accessibility of hydro-alcoholic solutions and hand hygiene. Regular handwashing with soap has been linked to hand eczema [24]. Although this study did not explore these potential side effects, it is believed that they could have influenced the compliance of the study population with hand hygiene practices.

#### **Social distancing**

Less than half of haemodialysis patients adhered to social distancing (47.2%). In North Africa, good adherence to social distancing has been reported among cancer patients [19]. An adherence percentage of 76.6% has been reported among chronically ill patients in Ethiopia [20]. The low adherence percentage in our study can be explained by the configuration of the haemodialysis centre (shared waiting room, shared haemodialysis room), which makes it challenging to respect social distancing. Indeed, the difficulties in adopting a physical distance in certain public places have been identified as an obstacle to adherence to this barrier measure in COVID-19 [22]. Being vaccinated against COVID-19 and fear of COVID-19 encouraged adherence to social distancing. In the context of denial of COVID-19, fear of the disease impacts adherence to vaccination, which could lead to strong adherence to the various public health measures to fight the disease. In Burkina Faso, as in other sub-Saharan African countries, implementing physical distancing measures was not accompanied by adequate social support for vulnerable people. For example, dialysis patients had to deal with daily challenges such as acquiring essential goods and using public transportation for independent people. For those who were not independent, the lack of suitable care facilities meant they relied on their families or loved ones for support. In such conditions, maintaining a minimum distance of 1.5 meters was difficult. Additionally, cultural habits, such as mandatory participation in social activities like baptisms, funerals, and religious services, continued during the pandemic, making adherence to social distancing measures challenging.

#### **Coughing and sneezing hygiene**

Our study reports a 60% adherence among haemodialysis patients to cough and sneeze hygiene. Confidence in COVID-19 was the only factor related to adherence to this physical measure. In an observational study of respiratory hygiene behaviour in public before the COVID-19 pandemic, Robert J. Wolff found that less than 2% of people covered themselves when coughing and sneezing [25]. An observational addition to this study was carried out during the COVID-19 pandemic, with the author reporting that 38% of people did not cover up. However, in Ethiopia, Andarge E *et al.* reported higher adherence. These authors reported that 90.6% of respondents said they covered their mouth and nose when coughing or sneezing [20].

### Limitations and strength

The evaluation was based on patients' statements and not on observed facts. This may result in some subjectivity. However, the fact that the study was conducted during the pandemic's peak means that the declarations reflect the day-to-day behaviour of hemodialysis patients at our centre, as memory bias was minimised. We obtained similar results from studies in other countries with the same social and cultural realities as ours.

## 5. Conclusion

In our study, wearing a mask was the most respected physical measure, while social distancing was the least respected. COVID-19 vaccination status, level of education, fear of COVID-19, and denial of COVID-19 were influenced by adherence to physical measures. This study needs to be supplemented by a qualitative survey to understand the reasons for the diversity in adherence to barrier measures.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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