



Review

## GENDER AND SOCIO-ECONOMIC ISSUES IN THE CLINICAL ASSESSMENT OF ORTHOPAEDIC PATIENTS DURING THE COVID-19 PANDEMIC

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### ABSTRACT

This observational study aims to depict the impact of gender and socio-economic issues on the health status of Italian Orthopaedic patients during the COVID-19 lockdown. An *Ad Hoc* questionnaire was developed and administered online. The following data were extracted from the questionnaire: age, body mass index (BMI), education level, distance from hospital, orthopaedic disease, concomitant medical comorbidities, living status (with/without cohabitants) and physical activity level (according to Tegner Activity Scale). The impact of the COVID-19 lockdown was studied by analysing differences related to the parameters mentioned above.

A significant increase in the call number to general practitioners and the orthopaedic surgeon was observed during the COVID lockdown, especially in patients with higher education levels. Reduced compliance in drug assumption was observed in patients with higher education levels during the lockdown ( $p=0.007$ ). Almost all the analysed items were significantly influenced by the distance between the patient's domicile and the nearest hospital. However, no significant differences were observed comparing the pre-COVID to COVID lockdown.

Patients' gender and education level in the present study revealed a significant impact on their social behaviour during the COVID lockdown, compared with the pre-COVID period.

**KEYWORDS:** *Covid-19 perception, general well-being, orthopaedic patients, gender, pandemic, socio-economic issues*

### INTRODUCTION

In late February 2020, a severe coronavirus disease 2019 (COVID-19) cluster was unexpectedly depicted in Northern Italy.

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The first autochthonous case of COVID-19 was diagnosed on February 20th in Codogno (Lodi, Lombardy). In the following 24 hours, thirty-six new COVID-19 cases, non-directly linked to Codogno Patient-1, were reported in Lombardy and Veneto.

The Italian Council of Ministers quickly put the two COVID-19 outbreak areas in quarantine, thus identifying the so-called “red zones”. Nonetheless, the virus spread exponentially in Northern Italy and throughout the country in a few days.

Consequently, hospitals become overcrowded, several healthcare professionals become infected, and a dramatic increase in mortality rate among COVID-positive patients with comorbidities was depicted. Based on these findings, on March 9th, 2020, the Italian government released a new decree prohibiting travel and movement in public places, except for justifiable work reasons: the whole country was on lockdown.

This new scenario had an unpredictable impact on the mental status of COVID and non-COVID patients and healthcare professionals (1–3).

Previous studies have reported that the Severe Acute Respiratory Syndrome (SARS) epidemic and the H1N1 flu significantly impacted people’s mental status (4, 5). Therefore, during the SARS outbreak, several studies investigated the psychological impact of the disease on the non-infected community (6-9). Older age, female gender and higher education were related to a higher fear of SARS contagion; for this reason, they used individual protective devices (10).

Currently, there is little information about gender and socio-economic differences in the perception of the COVID-19 pandemic. This study aims to depict the impact of gender and socio-economic issues on the health status of Italian Orthopaedic patients during the COVID-19 lockdown.

## MATERIALS AND METHODS

A prospective multicentric observational study was performed. The study included all the Orthopaedic patients in Italy who were referred to the Orthopaedic emergency departments and Orthopaedic outpatient departments.

All the patients received an invitation to voluntarily take part in the study. All the information collected had no diagnostic purposes, and the results were treated confidentially, guaranteeing complete anonymity. Each patient completed an online form provided by the Orthopaedic surgeons involved in this multicenter study; all the data were subsequently gathered in a unique anonym database.

An *Ad Hoc* questionnaire was developed and administered online. The following data were extracted from the questionnaire: age, body mass index (BMI), education level, distance from hospital, orthopaedic disease, concomitant medical comorbidities, living status (with/without cohabitants) and physical activity level (according to Tegner Activity Scale).

All the participants were also asked to describe their relationship with the general practitioner, the orthopaedic surgeon and the Emergency Department during the pre-COVID period (November 2019-January 2020) compared to the COVID lockdown period (March-April 2020) and compliance with drugs assumption and the local therapy (intra-articular injections, shock waves therapy, physiotherapy) administration. The frequency of patients looking for information about their health condition on the internet and the fear of COVID-19 infection was also investigated.

The impact of the COVID-19 lockdown was studied by analysing differences related to gender, age, education level, distance from the hospital, number of medical comorbidities and living status.

Statistical analysis was performed using SPSS (version 20; IBM Corp, Armonk, NY). Descriptive statistics were used to evaluate the sample’s demographic characteristics. The Chi-square test and Fisher’s exact test were used to assess the variability between groups.

The Kruskal-Wallis test was performed to assess the variability between subgroups. The tests were two-tailed; statistical significance was set at  $p < 0.05$ .

## RESULTS

The primary data of the study are summarised in Table I. 782 patients completed the *Ad Hoc* questionnaire (male: 422; female:360; mean age: 59.77).

Table II shows gender- and age-related differences between the pre-COVID and COVID lockdown periods. No significant differences between genders and different age subgroups were depicted.

Table III summarises gender- and education-level-related differences between the pre-COVID and COVID lockdown periods. A significant increase in the call number to the general practitioner and the orthopaedic surgeon was observed during the COVID lockdown, especially in patients with higher education levels. Reduced compliance in drug assumption was observed in patients with higher education levels during the lockdown ( $p=0.007$ ).

Table IV shows the results of the gender-specific analysis concerning patients' distance from the hospital. Almost all the analysed items were significantly influenced by the distance between the patient's domicile and the nearest hospital. However, no significant differences were observed comparing the pre-COVID to COVID lockdown. Table V focuses on the analysis of the patient's comorbidities. No significant differences were depicted. Table VI summarises gender- and living status-related analysis. No significant differences were observed.

**Table I.** Main data of the study.

	All (n;%)	Female (n;%)	Male (n;%)	p-value
<b>Patients, n (%)</b>	<b>n=782;100%</b>	<b>360;46.04%</b>	<b>422;53.96%</b>	
<b>Age</b>				.061
18-35 years, n (%)	22	12	10	
36-50 years, n (%)	58	36	22	
51-65 years, n (%)	325	145	180	
>65 years, n (%)	377	167	210	
<b>Education</b>				.006*
< High school	72	46	26	
High school	64	30	34	
Degree	646	284	362	
<b>Distance from hospital</b>				.086
<2km	342	152	190	
2-10 km	256	125	131	
10-20 km	39	24	15	
>20 km	145	59	86	
<b>Orthopaedic disease</b>				.454
Trauma	144	63	81	
Osteoporosis	153	68	85	
Osteoarthritis	164	83	81	
Muscle/tendon diseases	156	65	91	
Spine diseases	165	81	84	
<b>Medical comorbidities</b> (i.e., obesity, diabetes, hypertension, dyslipidaemia, ischemic heart disease, COPD, malignancies)				.151
None	542	251	291	
1	206	91	115	
2	17	6	11	
>2	17	12	5	
<b>Living status</b>				.031*
Alone	173	77	96	
With 1 or more roommates	314	142	172	
With wife or husband	111	65	46	
With wife/husband and children	184	76	108	
<b>Physical activity level:</b>				
<b>Level 0:</b> Illness or disability pension	13	9	4	<.001*
<b>Level 1:</b> Sedentary work	199	102	97	
<b>Level 2:</b> Light work or walks on uneven ground but impossible excursions	105	53	52	
<b>Level 3:</b> Light jobs	131	69	62	
<b>Level 4:</b> Moderate heavy work	56	28	28	
<b>Level 5:</b> Heavy work, competitive sport-cycling, cross-country skiing, recreational sport, jogging on uneven ground at least 2 times a week	118	49	69	
<b>Level 6:</b> Recreational sport, tennis and badminton, handball, racquetball, skiing (downhill), jogging at least 5 times a week	96	35	61	
<b>Level 7:</b> Competitive sport-tennis, running, handball, recreational sport, soccer, football, rugby, ice hockey, basketball, squash, racquetball, running	41	10	31	
<b>Level 8:</b> Competitive sport, racquetball, bandy, squash or badminton, athletics, skiing (downhill)	4	0	4	
<b>Level 9:</b> Competitive sport, soccer, football, rugby (lower leagues), ice hockey, wrestling, gymnastics, basketball	15	5	10	
<b>Level 10:</b> National competitive sport, soccer, football, rugby	4	0	4	

**Table II. Gender and age-related analysis**

	Before COVID-19 pandemic								P-value*	During lockdown								P-value <sup>b</sup>	P-value <sup>c</sup>
	Female (n=360; 46%)				Male (n=422; 54%)					Female (n=360; 46%)				Male (n=422; 54%)					
	18-35 yrs.	36-50 yrs.	51-65 yrs.	>65 yrs.	18-35 yrs.	36-50 yrs.	51-65 yrs.	>65 yrs.		18-35 yrs.	36-50 yrs.	51-65 yrs.	>65 yrs.	18-35 yrs.	36-50 yrs.	51-65 yrs.	>65 yrs.		
Referral to a general practitioner (No/Yes)	4 8	25 11	84 61	94 73	9 13	41 17	183 142	199 178	.692	10 0	27 5	96 38	99 39	8 2	12 10	118 62	113 97	.302	.498
Referral to Orthopaedic surgeon (No/Yes)	7 5	30 6	101 44	106 61	15 7	47 11	217 108	234 143	.634	8 4	26 10	100 45	85 82	15 7	41 17	206 119	188 189	.705	.547
Call the general practitioner (No/Yes)	3 9	29 7	88 57	89 78	6 16	44 14	185 140	196 181	.825	8 4	29 7	88 50	110 49	15 7	36 22	221 104	256 121	.141	.737
Call to Orthopaedic surgeon (No/Yes)	7 5	32 4	103 42	106 61	14 8	49 9	210 115	240 137	.298	7 5	26 10	96 49	96 71	14 8	37 21	212 113	224 153	.175	.430
Referral to Emergency Department (No/Yes)	8 4	32 4	118 27	114 53	16 6	51 7	254 71	257 140	.695	12 0	36 0	142 3	166 1	21 1	55 3	315 3	377 0	.137	.928
Reported compliance in drug assumption (No/Yes)	12 0	30 6	129 16	152 15	20 2	51 7	285 40	337 40	.211	4 8	16 20	74 71	107 60	8 14	22 36	185 140	238 139	.161	.160
Reported compliance in local therapy** (No/Yes)	6 6	10 26	57 88	74 93	8 14	16 42	135 190	174 203	.473	4 8	11 25	50 95	84 83	7 15	19 39	131 194	201 176	.863	.867
Look for info about your health condition on the net (No/Yes)	5 7	21 15	90 55	119 48	9 13	36 22	04 121	274 103	.933	9 3	16 20	81 64	75 92	11 11	24 34	171 154	171 206	.080	.334
Fear of COVID-19 infection (No/Yes)										2 10	12 24	31 114	37 132	5 17	18 40	63 262	79 298	.784	

a=Multivariate Analysis between Females and Males Before COVID-19 pandemic; b= Multivariate Analysis between Females and Males During lockdown; c= Multivariate Analysis between Females and Males and Before and During COVID-19 pandemic; \*=p value<0.05.

**Table III. Gender and education level**

	Before COVID-19 pandemic						P-value <sup>a</sup>	During lockdown						P-value <sup>b</sup>	P-value <sup>c</sup>
	Female (n=360; 46%)			Male (n=422; 54%)				Female (n=360; 46%)			Male (n=422; 54%)				
	<High school	High school	Degree	<High school	High school	Degree		<High school	High school	Degree	<High school	High school	Degree		
Referral to the general practitioner (No / Yes)	26 20	18 12	163 121	17 9	24 10	184 178	.234	34 14	16 14	182 102	22 4	22 12	207 155	.277	.845
Referral to Orthopaedic surgeon (No / Yes)	36 10	24 6	184 100	25 1	26 8	218 144	.179	40 6	22 8	157 127	23 3	29 5	179 183	.332	.699
Call to the general practitioner (No / Yes)	27 19	22 8	160 124	17 9	26 8	179 183	.451	30 16	21 9	184 100	15 11	15 11	247 115	.051	.029*
Call to Orthopaedic surgeon (No / Yes)	36 10	26 4	186 98	23 3	27 7	215 147	.395	31 15	22 8	172 112	18 8	24 10	237 125	.536	.050*
Referral to Emergency Department (No / Yes)	43 3	28 2	201 83	26 0	32 2	248 114	.716	45 1	29 1	282 11	26 0	34 0	348 14	.228	.916
Reported compliance in drug assumption (No / Yes)	38 8	26 4	259 25	19 7	30 4	321 41	.587	22 24	18 12	161 123	13 13	8 26	231 131	.003*	.007*
Reported compliance in local therapy (intraarticular injections; shock waves therapy; physiotherapist) (No / Yes)	14 3	9 21	124 160	8 18	10 24	168 194	.954	11 35	3 27	135 149	2 24	5 29	202 160	.139	.457
Look for info about your health condition on the net (No / Yes)	23 23	15 15	197 87	10 16	17 17	261 101	.488	11 35	3 27	135 149	17 9	14 20	165 197	.450	.239
Fear of COVID-19 infection (No / Yes)								17 29	7 23	57 227	8 18	9 25	67 295	.808	

a=Multivariate Analysis between Females and Males Before COVID-19 pandemic; b= Multivariate Analysis between Females and Males During lockdown; c= Multivariate Analysis between Females and Males and Before and During COVID-19 pandemic; \*=p value<0.05.

**Table IV. Gender and distance from the hospital**

	Before COVID-19 pandemic								p value <sup>a</sup>	During lockdown								p value <sup>b</sup>	p value <sup>c</sup>
	Female (n=360; 46%)				Male (n=422; 54%)					Female (n=360; 46%)				Male (n=422; 54%)					
	<2km	2-10km	10-20km	>20km	<2km	2-10km	10-20km	>20km		<2km	2-10km	10-20km	>20km	<2km	2-10km	10-20km	>20km		
Referral to the general practitioner No / Yes	107 45	61 64	15 9	24 35	130 60	56 75	10 5	29 57	<.001*	102 33	80 30	15 6	35 13	118 72	81 50	8 7	44 42	.110	.847
Call to the general practitioner No / Yes	106 46	68 57	15 9	20 39	122 68	64 67	9 6	27 59	<.001*	101 51	75 50	16 8	43 16	122 68	85 46	11 4	59 27	.234	.830
Referral to Orthopaedic surgeon No / Yes	127 25	74 51	19 5	24 35	153 37	70 61	10 5	36 50	<.001*	125 27	66 59	14 10	14 45	153 37	57 74	4 11	17 69	<.001*	.924
Call to Orthopaedic surgeon No / Yes	127 25	78 47	19 5	24 35	148 42	69 62	10 5	38 48	<.001*	95 57	83 42	14 10	33 26	135 55	84 47	11 4	49 37	.029*	.428
Referral to Emergency Department No / Yes	141 11	87 38	20 4	24 35	177 13	79 52	10 5	40 46	<.001*	151 1	122 3	24 0	59 0	182 8	125 6	15 0	86 0	.110	.249
Reported compliance in drug assumption No / Yes	130 22	11 7	21 8	55 4	158 32	118 13	12 3	82 4	.003*	58 94	82 43	15 9	46 13	82 108	85 46	13 2	72 14	<.001*	.529
Reported compliance in local therapy** No / Yes	38 114	62 63	10 14	37 22	53 137	69 62	6 9	58 28	<.001*	30 122	58 67	11 13	50 9	47 143	78 53	11 4	73 13	<.001*	.452
Look for info about your health condition on the net No / Yes	74 78	86 39	21 3	54 5	94 96	102 29	13 2	79 7	<.001*	86 66	70 55	11 13	41 45	103 87	65 66	6 9	22 64	<.001*	.588
Fear of COVID-19 infection No / Yes										43 109	25 100	9 15	4 55	55 135	16 115	3 12	10 76	.253	

a=Multivariate Analysis between Females and Males Before COVID-19 pandemic; b= Multivariate Analysis between Females and Males During lockdown; c= Multivariate Analysis between Females and Males and Before and During COVID-19 pandemic; \*=p value<0.05.

**Table V. Gender and medical comorbidities (i.e., obesity, diabetes, hypertension, dyslipidaemia, ischemic heart disease, COPD, malignancies)**

	Before COVID-19 pandemic								p value <sup>a</sup>	During lockdown								p value <sup>b</sup>	p value <sup>c</sup>
	Female (n=360; 46%)				Male (n=422; 54%)					Female (n=360; 46%)				Male (n=422; 54%)					
	None	-	2	3	None	-	2	3		None	-	2	3	None	-	2	3		
Referral to the general practitioner No / Yes	151 100	49 42	1 5	6 6	160 131	59 56	4 7	2 3	.788	158 93	60 31	5 1	9 3	163 128	79 36	5 6	4 1	.188	.170
Call to the general practitioner No / Yes	157 94	47 44	2 4	3 9	155 136	59 56	5 6	3 2	.244	174 77	52 39	2 4	7 5	191 100	76 39	6 5	4 1	.710	.908
Referral to Orthopaedic surgeon No / Yes	170 81	59 32	4 2	11 1	190 101	67 48	8 3	4 1	.910	152 99	55 36	1 5	11 1	155 136	63 52	8 3	5 0	.088	.165
Call to Orthopaedic surgeon No / Yes	177 74	58 33	4 2	9 3	184 107	70 45	7 4	4 1	.914	153 98	60 31	4 2	8 4	192 99	77 38	7 4	3 2	.894	.632
Referral to Emergency Department No / Yes	189 62	67 24	4 2	12 0	211 80	80 35	10 1	5 0	.677	250 1	89 2	6 0	11 1	282 9	111 4	10 1	5 0	.552	.532
Reported compliance in drug assumption No / Yes	221 30	87 4	5 1	10 2	259 32	99 16	8 3	4 1	.231	134 117	50 117	6 0	11 1	170 121	70 45	8 3	4 1	.560	.522
Reported compliance in local therapy** No / Yes	97 154	43 48	4 2	3 9	124 167	58 57	3 8	1 4	.392	107 144	37 54	4 2	1 11	147 144	57 58	4 7	1 4	.507	.986
Look for info about your health condition on the net No / Yes	164 87	62 29	4 2	5 7	20 88	79 36	5 6	1 4	.525	119 132	50 41	3 3	9 3	132 159	55 60	5 6	4 1	.923	.739
Fear of COVID-19 infection No / Yes										54 197	23 68	1 5	3 9	54 237	28 87	1 10	1 4	.983	

a=Multivariate Analysis between Females and Males Before COVID-19 pandemic; b= Multivariate Analysis between Females and Males During lockdown; c= Multivariate Analysis between Females and Males and Before and During COVID-19 pandemic; \*=p value<0.05.

## DISCUSSION

At the beginning of the second decade of the 21st century, in the era of Medicine 4.0, the healthcare systems worldwide fought the COVID-19 challenge. Italy was the first country to lockdown in Europe to struggle with the new coronavirus diffusion. This choice revealed helpful in flattening the COVID-19 curve but revolutionised several aspects of our lives.

Ruggieri et al. (11) have investigated the impact of gender differences on COVID-19 infection in Italy, depicting a higher mortality rate in male patients (14.8%) compared with female patients (8.2%). These authors suggest that biological (i.e., sexual hormones, X-linked gene expression and differential ACE2 expression levels) and lifestyle differences might explain these gender-related differences.

Moreover, Galasso et al. (12) analysed data from a survey conducted in March and April 2020 in eight Organization for Economic Co-operation and Development countries (n = 21,649) to study gender differences in COVID-19-related beliefs and behaviours. These Authors showed that women are more likely to perceive COVID-19 as a severe health problem, to agree with restraining public policy measures and comply with them.

This study has focused on analysing gender and socio-economic issues in the clinical assessment of Orthopaedic patients during the COVID-19 lockdown, compared with the pre-COVID-19 period. Gender, age, education level, distance from the hospital, number of medical comorbidities and living status were analysed. Gender and education level reveal the most relevant factors influencing the patients' social behaviour during the COVID lockdown, compared to the pre-COVID period. Patients' domicile distance from the nearest hospital also had a relevant impact on the patient's behaviour, but no significant differences were observed during the COVID lockdown compared to the pre-covid period.

Concerning the perceived risk of contracting the COVID-19 infection, Abrams et al. (13) have emphasised the role of risk communication during the COVID pandemic. Therefore, the fear of contracting COVID-19 disease is as real as the physical danger itself. The present study highlighted some aspects of the pandemic that can heighten the risk perception, i.e.; the so-called dread factors, that broadly apply to the current pandemic. These factors include high infection rates, COVID significant morbidity and mortality, the low availability of face masks and personal safety devices, the lack of therapeutic measures and the rapid virus spread.

These factors could underestimate the perception of risk among the general population, and, at the same time, they could also underestimate the importance of compliance with the restriction rules. Our data confirm the findings reported by Abrams et al. (13) since the vast majority (71.22%) of participants, in the absence of gender differences (p=0.082), reported a quite high contagion perception risk.

Furthermore, Abrams et al. (13) have also emphasised that daily headlines generate widespread fear and panic; and the World Health Organization (WHO) reported that a significant part of effective communication risk includes identifying and managing rumours and misinformation. In this context, our data support the report by Abrams et al. since 304 women (38.87%) and 264 men (33.76%) affirmed they had a medium-high level of fear of contracting the infection. This finding has probably promoted respect for the limitations imposed by the Italian government: 355 women (45.40%) and 411 men (52.56%) affirmed they paid attention to adopting all the measures needed to reduce the risk of SARS-CoV-2 infection.

Moreover, Jungmann et al. (14) highlighted that health anxiety and cyberchondria had increased SARS-CoV-2 anxiety. Jungmann et al. also observed that anxiety is negatively related to the degree of information about the pandemic status. Our data agree with this finding since the participants' psychological level and perception of their level of information on the pandemic condition are good.

The findings reported in the present study are useful for planning future public health policies to improve patient care and optimise patient compliance.

## CONCLUSION

Patients' gender and education level in the present study revealed a significant impact on their social behaviour during the COVID lockdown, compared with the pre-COVID period. In addition, patients' domicile distance from the nearest hospital also plays an important role in influencing patients' behaviour and clinical compliance. These findings are useful to better plan future public health policies.

### *Conflicts of Interest:*

The authors declare no conflict of interest.

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