

## Coronavirus Pandemic

# Evaluation of COVID-19 preventive practices among sellers in the Beni Mellal region of Morocco

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### Abstract

**Introduction:** Coronavirus disease 2019 (COVID-19) is caused by the SARS-CoV-2 virus. It has impacted millions of individuals and caused numerous casualties. Consequently, there was a race to develop vaccines against the virus. However, there has been unequal vaccine distribution among nations, and concerns over side effects have resulted in vaccine hesitancy, reducing vaccination rates in many countries and hindering pandemic eradication. Preventive measures like well-fitted masks, frequent hand washing, alcohol-based sanitizers, and maintaining physical distance remain crucial to curb SARS-CoV-2 transmission. This study examined the adoption of these preventive measures among sellers in the Beni Mellal region of Morocco.

**Results:** We analyzed a cohort of 700 merchants, including 40.28% middle-aged males. Among them, 53% (371/700) wore masks, with 61.08% using medical masks, and 44.05% correctly positioned their masks. Additionally, 20.29% (142/700) carried disinfectants, of whom 117 used them at least once in 30 minutes. However, physical distancing was lacking in 78.29% of sellers, particularly among young and middle-aged males (18% and 31.86%, respectively). More than 80% of the vendors had frequent physical contact with others, primarily through hands. Surprisingly, only 1% (7/700) of participants combined the following preventive measures: using a disinfectant at least once, wearing a well-fitted mask, practicing physical distancing, and avoiding contact with others. Two individuals (0.29%) refrained from touching any surfaces. Money accounted for 76.57% of commonly touched surfaces; yet only 0.29% adhered to the preventive measures while handling money. Furthermore, a majority of individuals (92.14%, 645/700) were observed touching their faces at least once.

**Key words:** barrier gestures; sellers; COVID-19; Beni Mellal.

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### Introduction

The coronavirus disease 2019 (COVID-19) pandemic is caused by the severe acute respiratory syndrome coronavirus (SARS-CoV-2) [1]. SARS-CoV-2 has a single-stranded positive-sense RNA genome of 29,891 nucleotides [2]. The disease was initially reported in the Wuhan province of China at the end of 2019 and rapidly spread to most parts of the world [2]. In fact, the novel virus has been transmitted to 231 other countries and territories worldwide [1,3], infecting over 693.5 million individuals and claiming nearly 7 million lives globally, as of 15 August 2023 [1,3].

The outbreak has prompted the global community to search for new drugs and vaccines against SARS - CoV-2. However, drugs designed specifically for the treatment of COVID-19 will require long years of development for the evaluation of drug delivery safety, pharmacokinetics and side effects before it is ensured

that they are safe for human consumption [1]. In the meantime, there is urgent need to treat COVID-19-positive patients. A combination of existing medications and antiviral drugs has been suggested as a good and safe option to potentially reduce the disease severity and its progression as well as to halt virus transmission, besides using broad-spectrum antibiotics to tackle pneumonia resulting from secondary infection [1,4].

At the same time, numerous vaccine strategies have been developed to stimulate a protective adaptive immune response [5]. Consequently, in September 2020, the World Health Organization (WHO) announced the release of COVID 19 vaccines [6], including Sinopharm, AstraZeneca-Oxford and Pfizer-BioNTech vaccines. However, vaccine doses have not been distributed equitably globally. The vast majority of vaccines have been administered in high- and upper-middle-income countries [7].

The efficacy of different vaccines to prevent infection by SARS-CoV-2 varies. The rates were reported as 66%, 70.4%, 91.4%, 94.1% and 95% for Janssen, AstraZeneca, Sputnik V, Moderna and Pfizer vaccines, respectively [5,6]. Furthermore, instances of significant adverse events have been reported following vaccine administration, such as a diffuse eczematiform eruption [8] and facial Bell's paralysis after Pfizer-BioNTech and Moderna vaccination, respectively [5,9]. With the escalating mass vaccination campaigns, these reactions are likely to cause public concern and accordingly lead to vaccination aversion [8,10].

In addition, it was reported that the virus is constantly evolving and spreading through asymptomatic carriers, further suggesting a high global health threat [1].

Given these data, the most effective strategy to prevent SARS-CoV-2 infection and mitigate its transmission is to be well informed about the disease and how the virus spreads [11]. COVID-19 is a respiratory illness, primarily transmitted through person-to-person contact and through direct contact with respiratory droplets generated when an infected person coughs or sneezes. As these respiratory droplets are too heavy to be airborne, they land on objects and surfaces surrounding the infected person. Infection may occur when someone touches a contaminated surface, object, or the hand of an infected person and then touches their own mouth, nose, or eyes [12]. To counter this, practices like frequent hand washing, use of hand sanitizers, maintaining a distance of at least one meter from others, and wearing a properly fitted mask are crucial. These measures play an important role in reducing disease transmission and have been the prime focus for infection control [2,11,12]. However, the pivotal question remains: "Is the general population adequately aware of these measures?"

Many countries have been affected by the pandemic. This study focuses on the example of Morocco. Morocco has been significantly affected by the pandemic with 1,272,386 infections and 16,296 deaths reported up to 15 August 2023 [13]. The country has experienced 5 notable waves of transmission. The most recent wave was the Omicron wave which emerged in early November 2022 and peaked four weeks later. New infections began to decline in early December 2022 [14].

The initial COVID-19 wave started in Morocco on 2 March 2020 and ended in June 2020 [15]. During this period, the country declared a "State of Health Emergency" and implemented containment measures to curb virus spread [15]. Starting from 10 June 2020, the

Moroccan government gradually eased containment measures. However, following the sacrifice holiday (Eid al-Adha) in August 2020 and the resumption of schools in September 2020, the numbers of infections, deaths and patients in intensive care increased, resulting in an immense pressure on the healthcare system [15]. The highest number of cases and deaths was recorded during the last week of October 2020 with 24,623 confirmed cases and 440 deaths [15]. This highlights the fact that the Moroccan people shifted away from preventive practices against COVID-19.

The current study is designed as a descriptive study with the objective of assessing adherence to preventive measures to curb the spread of SARS-CoV-2. The evaluation is based on observations of COVID-19 preventive measures taken by vendors in the markets of the Beni Mellal-Khenifra region, following the relaxation of quarantine restrictions in Morocco. The sellers have extensive interaction with the public in market settings. Thus, their choice of adopting or ignoring the COVID-19 preventive measures influence the transmission of the SARS-CoV-2 virus.

## Methodology

Morocco declared a "state of health emergency" on 19 March 2020, enabling the implementation of various preventive measures, including a lockdown that restricted the movement of people and the closure of national borders. Later on, the restrictive measures were reduced and the lockdown was gradually lifted [15]. The Moroccan government began to ease containment measures starting from 10 June 2020. Observations regarding adherence or non-adherence to protective measures by vendors in public markets were carried out ten months later, between 13 April and 15 May 2021. The vendors were observed in various types of public markets. A convenience sample of observations was used and the sample was limited to adults who were observed for a minimum of 30 minutes in public settings.

### *Design of the study*

The study aimed to analyze the frequency of personal protective equipment use, face touching, physical distancing, and contacts with surfaces among vendors in the public markets of Beni Mellal-Khenifra region.

### *Beni Mellal-Khenifra region*

The Beni Mellal-Khenifra region comprises of five provinces (Figure 1): Azilal, Beni Mellal, Fquih Ben Salah, Khenifra and Khouribga; encompassing 135

communities, including 16 municipalities and 119 rural communities. The regional capital is Beni Mellal. The Beni Mellal-Khenifra region covers an area of 28,088,4 km<sup>2</sup> which accounts for almost 4% of Morocco's territory [16].

In 2014, the population of the Beni Mellal-Khenifra region was 2,520,776 inhabitants, constituting 7.4% of Morocco's total population. This population is evenly distributed across the region's provinces, with an average density of 88.8 inhabitants per km<sup>2</sup>, compared to the national average of 47.6 inhabitants per km<sup>2</sup> [16].

In 2018, the region's economy recorded a growth rate of 1.3% in comparison to 2017. This growth rate was below the national average of 3.1%. The Beni Mellal-Khenifra region contributes 6.6% to the national GDP [16].

The agri-food markets within the Beni Mellal region feature diverse activities and adhere to sectoral distribution based on the nature of exhibited products. Furthermore, these markets have semi-open structures.

#### *Inclusion and exclusion criteria*

All data collected from observing sellers in public markets for a duration of 30 minutes were included in the study for the region. Vendors observed for less than 30 minutes were excluded.

#### *Data collection*

The observations were made according to the method adopted by [17] with some modifications. Briefly, a trained observer observed each vendor from a distance of several meters, refraining from any direct contact with the participants. The observation period for each seller lasted for 30 minutes.

**Figure 1.** Administrative division of the Beni Mellal-Khenifra region (Direction Régionale de Béni Mellal-Khénifra, 2019).



The participants were divided by age into three groups: young adults (18–35 years; n = 223), middle-aged adults (36–55 years; n = 362), and older adults (older than 55 years; n = 115). The gender of the vendors (male, n = 525; female, n = 175) was also recorded.

The observers recorded whether the sellers wore a face mask, the type of mask (medical or not), whether the mask was worn properly (well-placed or misplaced), whether they used a visor, and whether they wore gloves.

The study also recorded whether the individuals carried a disinfectant, and the frequency of its use within a 30-minute interval.

Occurrences of face touching were categorized by specific areas. The mucosal zone included eyes, nose, and mouth; while all other regions were classified as non-mucosal. A checklist was used to record the number of times the observed sellers touched their facial area, mask, surfaces, or other individuals.

#### *Statistical analysis*

The data were reviewed to identify any missing and incomplete observations and these were subsequently excluded from the analysis.

The data was analyzed in Microsoft Excel (Microsoft, 2016). Dynamic cross-tabulations were utilized to calculate frequencies and means for mask, visor, and gloves use. The frequencies of personal protective equipment usage, face touching, adherence to physical distancing, contact with others and contact with surfaces were evaluated based on age and gender.

The data were reviewed to determine whether sellers combined protective measures or not and to identify potential transmission through the most frequently touched surface. Additionally, the total number of touches within mucosal zones were summed and divided by the duration of observations to calculate an average number per hour.

Student and ANOVA analyses with SPSS version 20 software were used to compare means across different parameters.

## **Results**

### *Characteristics of the studied population*

A cohort of 700 merchants of varying age and of both genders was observed over a period of 32 days (from 13 April to 15 May 2021). The majority (75%) of the studied population consisted of male merchants. Among them, 40.28% were middle-aged. Older women accounted for only 3.57% of the population.

*Adherence to preventive measures*

Personal protective equipment

Out of a total of 700 sellers, 371 wore masks. Among them, 61.08% wore medical masks, and only 44.05% properly positioned their mask, regardless of whether it was medical or not (Table 1). Older women constituted the smallest proportion (2.28%) of sellers who used a mask for protection against the SARS-CoV-2 virus (Table 2). Conversely, 21.29% middle-aged male sellers wore a mask. A subset of this population, 133 out of 329 individuals (19%), did not wear a mask at all.

The use of gloves and visors were underestimated by the sellers. 92.85% and 81% of sellers did not use gloves or visors, respectively. This trend was especially noticeable among middle-aged males, (37.72% and 33.14% respectively).

Only 142 out of 700 individuals (20.29%) carried a disinfectant, and among them, 117 sellers used it at least once during the 30 min period. Among these sellers, 58 were young individuals, and 52 were middle-aged. Furthermore, the frequency of disinfectant use ranged

**Table 1.** Frequency and percentage of population wearing masks.

Variables	n (%)
<b>Wearing a mask</b>	
Yes	371 (53)
No	329 (47)
Total	700 (100)
<b>Type of mask</b>	
Medical	226 (61)
Non-medical	145 (39)
Total	371 (100)
<b>Position of mask</b>	
Well-placed	163 (44)
Misplaced	208 (56)
Total	371

from once to 13 times, with an average usage of 6.7 times per 30 minutes. However, the percentage of individuals using disinfectant between 4 and 13 times did not exceed 13.19% (Table 2).

Physical distancing and contact with other people

We observed that 78.29% of sellers did not practice physical distancing; this was especially the case among young and middle-aged males (18% and 31.86%, respectively). Moreover, the majority of vendors had

**Table 2.** Frequency and percentage of individuals practicing personal protective measures in the population studied according to age and gender (N = 700).

Age Gender	Young		Middle-aged		Older		Total
	Male	Female	Male	Female	Male	Female	
<b>Wearing a mask</b>							
Yes	62 (8.86%)	51 (7.29%)	149 (21.29%)	50 (7.14%)	43 (6.14%)	16 (2.28%)	371 (53%)
No	91 (13%)	19 (2.71%)	133 (19%)	30 (4.29%)	47 (6.71%)	9 (1.29%)	329 (47%)
Total	153 (21.86%)	70 (10%)	282 (40.29%)	80 (11.43%)	90 (12.85%)	25 (3.57%)	700 (100%)
<b>Wearing gloves</b>							
Yes	10 (1.43%)	7 (1%)	18 (2.57%)	9 (1.29%)	4 (0.57%)	2 (0.29%)	50 (7.15%)
No	143 (20.43%)	63 (9%)	264 (37.72%)	71 (10.14%)	86 (12.28%)	23 (3.28%)	650 (92.85%)
Total	153 (21.86%)	70 (10%)	282 (40.29%)	80 (11.43%)	90 (12.85%)	25 (3.57%)	700 (100%)
<b>Wearing visor</b>							
Yes	30 (4.29%)	19 (2.71%)	50 (7.15%)	12 (1.71%)	16 (2.28%)	6 (0.86%)	133 (19%)
No	123 (17.57%)	51 (7.29%)	232 (33.14%)	68 (9.72%)	74 (10.57%)	19 (2.71%)	567 (81%)
Total	153 (21.86%)	70 (10%)	282 (40.29%)	80 (11.43%)	90 (12.85%)	25 (3.57%)	700 (100%)
<b>Carrying a disinfectant</b>							
Yes	35 (5%)	34 (4.86%)	37 (5.29%)	26 (3.72%)	6 (0.85%)	4 (0.57%)	142 (20.29%)
No	118 (16.86%)	36 (5.14%)	245 (35%)	54 (7.71%)	84 (12%)	21 (3%)	558 (79.71%)
Total	153 (21.86%)	70 (10%)	282 (40.29%)	80 (11.43%)	90 (12.85%)	25 (3.57%)	700 (100%)
<b>Used a disinfectant at least once in 30 min (N = 142)</b>							
Did not use disinfectant in 30 min	6 (4.22%)	5 (3.52%)	8 (5.63%)	3 (2.11%)	1 (0.71%)	2 (1.41%)	25 (17.60%)
Total	37 (26.05%)	32 (22.54%)	37 (26.05%)	26 (18.31%)	6 (4.23%)	4 (2.82%)	142 (100%)
<b>Frequency of using a disinfectant in 30 min N = 117</b>							
1 time	14 (11.96%)	14 (11.96%)	18 (15.38%)	10 (8.56%)	2 (1.71%)	0	58 (49.57%)
2 times	4 (3.42%)	5 (4.27%)	6 (5.13%)	5 (4.27%)	2 (1.71%)	1 (0.855%)	23 (19.66%)
3 times	6 (5.13%)	5 (4.27%)	0 (0%)	5 (4.27%)	1 (0.855%)	0	17 (14.53%)
4 times	0	2 (1.71%)	2 (1.71%)	0 (0%)	0	0	4 (3.42%)
5 times	0	0	1 (0.855%)	2 (1.71%)	0	0	3 (2.56%)
6 times	2 (1.71%)	1 (0.855%)	0	0	0	1 (0.855%)	4 (3.42%)
7 times	1 (0.855%)	0	0	1 (0.855%)	0	0	2 (1.71%)
8 times	2 (1.71%)	0	0	0	0	0	2 (1.71%)
9 times	1 (0.855%)	0	0	0	0	0	1 (0.855%)
10 times	0	0	1 (0.855%)	0	0	0	1 (0.855%)
12 times	1 (0.855%)	0	0	0	0	0	1 (0.855%)
13 times	0	0	1 (0.855%)	0	0	0	1 (0.855%)
Total	31 (26.50%)	27 (23.07%)	29 (24.79%)	23 (19.66%)	5 (4.27%)	2 (1.71%)	117 (100%)

contact with other people (84.86%), of whom 53.14% were also young and middle-aged males (Table 3). All the older women had contact with others.

On the other hand, out of 152 sellers practicing physical distancing, only 41 had no contact with people (5.86%). In contrast, among the 548 sellers who did not practice physical distancing, 483 had contact with people (69%) (Table 4).

Additionally, 594 sellers, especially younger and middle-aged males, made contact with other people through their faces, hands or other parts of the body. Most people came into contact with others through their hands (89.06%). In addition, 47.98% of individuals contacted others face to face.

The frequency of touching hands within a 30-minute period ranged from once to 20 times, with an average of  $10.16 \pm 3.19$  times. The most common frequency of touching others with hands was between 1-3 times, representing 58.02% of occurrences (Supplementary Table 1).

Association of preventive measures

Based on our findings, a significant portion of the population did not combine preventive measures. Specifically, 220 out of 700 (31.42%) did not employ a disinfectant, neglected to wear a mask, did not practice physical distancing, and still had contact with people (Supplementary Table 2). Meanwhile, only 7 out of 700 individuals (1%) used a disinfectant at least once, wore a mask correctly, practiced physical distancing, and avoided contact with others.

Facial touching behavior

The frequency of face touching behavior among sellers was evaluated during a total observation time of 30 minutes. Our results revealed that 645 of 700 observed individuals (92.14%) touched their face at least once. Among them, 628 individuals (89.71%) touched mucosal areas of the face; especially the mouth (65.57%), eyes (69%) and nose (73.86%); whereas 35% of sellers touched non-mucosal areas of the face, namely the ears, arms and hair (Supplementary Table 3).

**Table 4.** Evaluation of physical distancing practiced by sellers combined with contact with other people.

Variables	n (%)
<b>Physical distancing (N = 152)</b>	
and contact with people	111 (16)
and no contact with people	41 (6)
<b>Absence of physical distancing (N = 548)</b>	
and contact with people	483 (69)
and no contact with people	65 (9)
Total	700

Moreover, the average frequency of touching the mouth, eyes, nose and non-mucosal areas of the face were 16, 15, 15.46 and 16 times per hour, respectively.

Contact with surfaces

Our investigation discovered that only two individuals refrained from touching any surfaces (0.29%). Money was among the most frequently touched surfaces (76.57%). The handling of money varied from once to 37 times within a 30-minute observation period. The highest frequency of touching money was 6 times in 30 minutes, particularly among middle-aged and young male sellers. Meanwhile, the average frequency of touching money was 29.15 times per hour.

Plastic ranked second among the most frequently touched surfaces (75.14%), followed by mobile phones (68.29%). Cardboard was touched the least frequently (42.57%).

Interestingly, older women touched surfaces the least (3.57%), compared to young (21.71%) and middle-aged male vendors (40.15%) (Supplementary Table 4).

Impact of using masks and disinfectant on face touching

Our study observed that sellers who did not wear a mask touched their faces more frequently than those who wore masks properly. Indeed, 32.58%, 36.72% and 35.14% of non-mask wearers touched their eyes, nose and mouth, respectively, in comparison with 15.71%, 14.43% and 10.86%, respectively of those who wore well-fitted masks (Supplementary Table 5).

Non-mask wearers touched their faces' mucosal zones more frequently than mask wearers (14.2 vs 11.8,

**Table 3.** Evaluation of physical distancing practiced by sellers and contact with people according to age and gender (N = 700).

Age	Young		Middle-aged		Older		Total
	Male	Female	Male	Female	Male	Female	
<b>Practice of physical distancing</b>							
Yes (> 1 m)	27 (3.86%)	18 (2.57%)	59 (8.43%)	22 (3.14%)	16 (2.28%)	10 (1.43%)	152 (21.71%)
No (< 1 m)	126 (18 %)	52 (7.43%)	223 (31.86%)	58 (8.29)	74 (10.57%)	15 (2.14%)	548 (78.29%)
Total	153 (21.86%)	70 (10%)	282 (40.29%)	80 (11.43%)	90 (12.85%)	25 (3.57%)	700 (100%)
<b>Contact with other people</b>							
Yes	131 (18.71%)	54 (7.72%)	241 (34.43%)	69 (9.86%)	74 (10.57%)	25 (3.57%)	594 (84.86%)
No	22 (3.15%)	16 (2.28%)	41 (5.86%)	11 (1.57%)	16 (2.28%)	0	106 (15.14%)
Total	153 (21.86%)	70 (10%)	282 (40.29%)	80 (11.43%)	90 (12.85%)	25 (3.57%)	700 (100%)

14.46 vs 8, and 16 vs 8.86 times per hour for touching eyes, nose and mouth, respectively;  $p < 0.05$ ). Interestingly, wearing a misplaced mask increased the frequency of face touching compared to wearing a well-placed mask. In fact, these frequencies were 12.2, 10.88 and 13.1 times per hour for touching eyes, nose and mouth, respectively. Thus, proper mask usage decreased the frequency of touching face mucosal zones, potentially reducing SARS-CoV-2 transmission.

Since face touching could contribute to COVID-19 transmission in the absence of hand hygiene [17], we examined whether the sellers used disinfectants after face touching. We observed that the use of disinfectants reduced the frequency of face touching. 58%, 63% and 56.14% of non-users of disinfectants touched their mucosal face areas, namely eyes, nose and mouth, respectively which was higher compared to those using disinfectants (11%, 10.86% and 9.43% respectively; Table 5). Sellers who did not practice hand hygiene touched the mentioned zones more frequently than those who used disinfectants (15 vs 10.2, 13.6 vs 10.6 and 16 vs 11.75 times per hour for touching eyes, nose and mouth, respectively;  $p < 0.05$ ).

We analyzed the impact of disinfectant use on face touching among mask and non-mask wearer sellers (Supplementary Table 5) and found that the percentages of vendors who wore masks properly, used disinfectants and refrained from touching their mucosal face areas were quite low (3.14% for eyes, 4% for nose and 5.57% for mouth, respectively) compared to those who disregarded these practices and touched these areas (31.43%, 35.14% and 33.44%, respectively). In contrast, the combination of a properly worn mask and disinfectant usage further reduced the frequency of

facial touching. Thus, more touches of mucosal face areas were observed among sellers without masks and non-users of disinfectants compared to those wearing masks and using disinfectants (14.2 vs 10.2, 13.6 vs 7.33 and 16 vs 8.33 times per hour for touching eyes, nose and mouth, respectively;  $p < 0.05$ ).

The frequency of touching mucosal face areas diminished when sellers wore masks and used disinfectants compared to wearing masks only (10.2 vs 11.8, 7.33 vs 8 and 8.33 vs 8.86 times per hour for touching eyes, nose and mouth, respectively;  $p > 0.05$ ) or using disinfectants only (10.2 vs 10.2, 7.33 vs 10.6 and 8.33 vs 11.75 times per hour for touching eyes, nose and mouth, respectively;  $p > 0.05$ ). These observations supported our theory that combining a well-placed mask with proper hand hygiene could contribute to reducing SARS-CoV-2 transmission.

In addition, 25.86%, 28.43% and 27.43% of non-mask wearers did not practice physical distancing and touched their eyes, nose and mouth, respectively. The percentages of well-placed mask wearers who practiced physical distancing and refrained from touching their eyes, nose and mouth were 2.43%, 2.57% and 2.86%, respectively.

*Potential transmission through touching money*

Since money was the most frequently touched surface among sellers, we investigated whether our population adhered to proper preventive measures while handling money to prevent any potential indirect transmission of SARS-Cov-2. We observed that 24.43% individuals did not use sanitizer, did not wear masks correctly, did not practice physical distancing, and did not avoid contact with others while touching money. Conversely, only 0.29% individuals wore well-placed masks, followed the preventive practices and did not touch money (Supplementary Table 6).

**Discussion**

The objective of this study was to assess the adoption of SARS-CoV-2 preventive measures among 700 sellers in the Beni Mellal region of Morocco. Our data concluded that 21.29% of middle-aged male sellers and 2.28% of elderly women sellers wore masks. Wearing masks is essential to avoid infection regardless of gender or age. While older adults are particularly susceptible to COVID-19 due to age-related immune decline [18], it is important to recognize that COVID-19 can affect individuals of all ages, potentially leading to severe illness or death [11].

All age groups can be affected by COVID-19 and can be hospitalized when the disease progresses into

**Table 5.** Touching face mucosal zones and disinfectant use.

Variables	n (%)
<b>Using disinfectant at least once (N = 117)</b>	
and touching eyes	77 (11)
and not touching eyes	40 (6)
<b>Not using disinfectant (N = 583)</b>	
and touching eyes	406 (58)
and not touching eyes	177 (25)
Total	700
<b>Using a disinfectant at least once (N = 117)</b>	
and touching nose	76 (11)
and not touching nose	41 (6)
<b>Not using a disinfectant (N = 583)</b>	
and touching nose	441 (63)
and not touching nose	142 (20)
Total	700
<b>Using a disinfectant at least once (N = 117)</b>	
and touching mouth	66 (9)
and not touching mouth	51 (7)
<b>Not using a disinfectant (N = 583)</b>	
and touching mouth	393 (56)
and not touching mouth	190 (27)
Total	700

severe consequences including pneumonia, fever, nausea and gastrointestinal issues [2]. For example, in an investigation involving 3,222 adults (18 to 34 years) who contracted COVID-19 and became sick enough to necessitate hospitalization, 684 patients (21%) ended up in intensive care, 331 (10%) required mechanical ventilation, and 88 (2.7%) died. Vasopressors or inotropes were used for 217 patients (7%), central venous catheters for 283 (9%), and arterial catheters for 192 (6%) [19]. Similarly, in another study [20], out of 177 pediatric and young adult patients with SARS-CoV-2 infection, 44 (25%) required hospitalization. Among them, 9 patients (20%) were critically ill. Moreover, children who were < 1 year old and adolescents and young adults > 15 years of age were overrepresented among hospitalized patients. Among critical care admissions, adolescents and young adults > 15 years of age constituted 66% (6/9). Both males and females were equally represented within the total SARS-CoV-2-infected cohort (52% male, 48% female), as well as the infected hospitalized cohort (50% male, 50% female). Although there was a predominance of males among the critically ill hospitalized group (67% male, 33% female), this difference was not statistically significant [20]. Life-threatening manifestations of the infection have been associated with predisposing factors, particularly respiratory insufficiency, hypertension, diabetes, and morbid obesity [2,19].

On the other hand, it was reported that the virus is constantly evolving and spreading through asymptomatic carriers [1]. Indeed, in some cases, infected individuals may be asymptomatic or pre-symptomatic and may show no signs or symptoms of disease or may present with mild symptoms that are easily overlooked. Some infected individuals who have not yet displayed symptoms have been shown to be contagious and capable of spreading the virus [12]. Consequently, they could unknowingly spread the disease to their families and those around them, especially individuals who are highly vulnerable to infection. Therefore, wearing a properly positioned mask remains one of the most effective preventive measures against the COVID-19 disease.

A significant portion of sellers did not wear gloves (92.85%) or visors (81%). Face shields can be used as a personal protective equipment for eye protection to reduce the risk of potential ocular inoculation by SARS-CoV-2 [21,22]. However, a face shield may confer partial protection of the facial area against respiratory droplets, as these are smaller and may reach mucous membranes or eyes through the open gaps between the

visor and the face. For this reason, the use of a face shield should be combined with wearing a medical mask or a respirator [21].

Although medical gloves remain an essential part of the infection control strategies, they need to be changed frequently and hands must be washed between glove changes and after glove removal [12,23]. This caution arises from the risk of incorrect glove use, which can inadvertently favor the spread of SARS-CoV-2. In fact, prolonged use of gloves in daily activities might lead to a false sense of security, potentially reducing the frequency of necessary handwashing and increasing the risk of self-contamination [12,23].

Wearing gloves can also allow bacteria to build up on hand surface. Therefore, handwashing is extremely important when removing gloves to avoid subsequent contamination. Moreover, it has been established that viruses can survive on gloves for 2 to 4 hours [23]. Thus, meticulous hand hygiene using water and soap or alcohol-based hand rub solutions offers greater protection against infection than relying solely on disposable gloves [2,12]. Alcohol-based disinfectants (such as ethanol, propan-2-ol, propan-1-ol) have been proven to significantly reduce infectivity of enveloped viruses like SARS-CoV-2 at concentrations of 70-80% [12]. These agents cause lipid membrane dissolution and protein denaturation, thereby disrupting the virus membrane and inhibiting metabolism [2]. In this context, our findings revealed that only 142 out of 700 individuals (20.29%) carried a disinfectant. Among them, 117 people used it at least once within the 30-minute period.

Furthermore, physical distancing is one of the measures by which transmission of COVID-19 can be reduced [12]. As such, it was recommended that individuals keep a distance of at least 1 m from one another and avoid crowded places to prevent the spread of the virus from person to person [24]. However, the present study indicated that 78.29% of sellers, especially young and middle-aged males, did not practice physical distancing. Additionally, 84.86% of vendors had contact with other people through the face, hands or other parts of the body. It is important to highlight that the absence of physical distancing coupled with close contact through handshakes or facial interactions could contribute to SARS-CoV2 transmission. Indeed, the primary mode of COVID-19 transmission remains through symptomatic person-to-person contact via respiratory droplets [23]. Furthermore, SARS-CoV-2 transmission arises through the inhalation of aerosol droplets, particularly in close-contact situations [24]. Consequently, the closer the

people get, the more the direct transmission is favored. Moreover, substantial portion of human respiratory tract infections are transmitted via contaminated hand contact with the mouth, eyes, and/or nostrils, and subsequent transport to target tissue sites in the oro- and nasopharyngeal region [25]. This situation is further exacerbated if proper disinfectant measures are not employed both before and after contact with others. Since the onset of the pandemic, WHO has strongly advocated the implementation of physical distancing and stringent hygiene measures. These include promoting frequent and effective hand washing and sanitation [12]. These measures are collectively crucial to prevent human-to-human transmission of SARS-CoV-2 [21]. Our goal was to determine whether sellers were cognizant of these recommendations and whether they were combining these preventive measures. It was evident from our observations that a significant portion of the population failed to integrate these preventive measures. In fact, 31.42% sellers did not practice any of the studied preventive measures.

The principal mode of community transmission is direct exposure to respiratory droplets, followed by self-inoculation of the virus into the facial mucosa after touching contaminated surfaces and fomites [17]. For this reason, maintaining physical distancing, practicing good hand hygiene and avoiding touching their face are recommended preventive measures against COVID-19 [17]. The frequency of face touching among sellers was evaluated during a 30-minute observation period. Our observations indicated that 92.14% of our population touched their faces at least once, of whom 89.71% made contact with mucosal areas of the face; especially the mouth (65.57%), eyes (69%) and nose (73.86%). In addition, the average number of touches for the mouth, eyes, nose were 16, 15 and 15.46 times per hour, respectively.

A previous study observed 92% of the sample touched their face at least once per hour and averaged 10 touches per hour (standard deviation, SD = 6). This study was conducted on 1000 Iranian people who were observed for 15-30 minutes in public places after quarantine restrictions were lifted in Shiraz, Iran [17]. Other investigations established that the average frequencies of face-touching were 16 times per hour in 10 students who were observed performing office work and 23 times per hour among Australian medical students in their first year at university over a total of 240 minutes of lectures [25,26]. In the latter study, 44% of touches involved mucosal areas of the face namely the mouth (36%), nose (31%) and eyes (27%) [26].

Enveloped viruses such as coronavirus and influenza A H1N1 are able to survive on inanimate surfaces for long periods [2]. SARS-CoV-2 can remain viable for up to 72 hours on plastic and stainless steel, up to 4 hours on copper, and up to 24 hours on cardboard [27]. Consequently, having contact with infected surfaces could be a factor leading to transmission of SARS-CoV-2. That is why we aimed to gauge the awareness of our studied population regarding touching inanimate surfaces. Our observations indicated that only 2 individuals refrained from touching any surfaces (0.29%). Among the frequently touched surfaces, money was the most prominent at 76.57%, with an average of 29.15 touches per hour. This is not surprising given that our population consisted of sellers.

We identified that non-mask wearers touched their facial mucosal areas more often than mask wearers (14.2 vs 11.8, 14.46 vs 8 and 16 vs 8.86 times per hour for touching eyes, nose and mouth, respectively;  $p < 0.05$ ). Our results corroborate with those found by another study that reported significantly more face touches regardless of area were observed in individuals without masks compared to those wearing masks (11 vs 8 times per hour) [17].

It was concluded that both proper mask usage and consistent hand hygiene may decrease the SARS-CoV-2 transmission.

## Conclusions

Our investigation aimed to evaluate the adherence to COVID-19 preventive measures based on observation of sellers in the markets of Beni Mellal-Khenifra region after the quarantine restrictions were lifted in Morocco. The majority of sellers did not follow the preventive measures, thus risking potential SARS-CoV-2 exposure for both themselves and others.

The sellers cannot avoid interaction with various individuals due to the nature of their work. However, the absence of proper adherence to preventive measures contributes to the virus's transmission. This likely explains why Morocco has experienced 5 waves of COVID-19.

On the other hand, it was shown that wearing masks and using disinfectants were associated with a significant reduction in the frequency of face touches within the mucosal area, particularly when compared to individuals who did not wear masks or utilize disinfectants. This highlights the importance of adhering to frequent hand hygiene practices and wearing well-fitted masks in order to effectively curtail the transmission of SARS-CoV-2.



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**Annex – Supplementary Items**

**Supplementary Table 1.** Comparison of the frequencies of touched areas.

Age		Young		Middle-aged		Older		Total	
Gender		M	F	M	F	M	F		
Hands	Yes	122 (20.54%)	45 (7.58%)	216 (36.36%)	60 (10.10%)	67 (11.28%)	19 (3.20%)	529 (89.06%)	
	No	9 (1.51%)	9 (1.52%)	25 (4.21%)	9 (1.52%)	7 (1.17%)	6 (1.01%)	65 (10.94%)	
Total		131 (22.05%)	54 (9.10%)	241 (40.57%)	69 (11.62%)	74 (12.45%)	25 (4.21%)	594 (100%)	
Face	Yes	62 (10.43%)	23 (3.88%)	124 (20.88%)	27 (4.55%)	39 (6.56%)	10 (1.68%)	285 (47.98%)	
	No	69 (11.62%)	31 (5.22%)	117 (19.69%)	42 (7.07%)	35 (5.89%)	15 (2.53%)	309 (52.02%)	
Total		131 (22.05%)	54 (9.10%)	241 (40.57%)	69 (11.62%)	74 (12.45%)	25 (4.21%)	594 (100%)	
Other touched zones	Yes	35 (5.89%)	15 (2.53%)	56 (9.43%)	23 (3.87%)	19 (3.19%)	7 (1.18%)	155 (26.09%)	
	No	96 (16.16%)	39 (6.57%)	185 (31.14%)	46 (7.75%)	55 (9.26%)	18 (3.03%)	439 (73.91%)	
Total		131 (22.05%)	54 (9.10%)	241 (40.57%)	69 (11.62%)	74 (12.45%)	25 (4.21%)	594 (100%)	
Frequency of touching hands in 30 min (N = 529)	1 time	16 (3.02%)	10 (1.89%)	36 (6.80%)	7 (1.32%)	5 (0.95%)	5 (0.95%)	79 (14.93%)	
	2 times	29 (5.48%)	9 (1.70%)	52 (9.83%)	16 (3.02%)	10 (1.89%)	5 (0.95%)	121 (22.87%)	
	3 times	24 (4.53%)	12 (2.27%)	34 (6.43%)	14 (2.65%)	18 (3.40%)	5 (0.95%)	107 (20.22%)	
	4 times	15 (2.84%)	5 (0.95%)	33 (6.24%)	4 (0.75%)	10 (1.89%)	0 (0%)	67 (12.67%)	
	5 times	10 (1.89%)	1 (0.19%)	14 (2.64%)	5 (0.95%)	8 (1.51%)	2 (0.38%)	40 (7.56%)	
	6 times	9 (1.70%)	1 (0.19%)	17 (3.21%)	2 (0.38%)	3 (0.57%)	2 (0.38%)	34 (6.43%)	
	7 times	6 (1.13%)	1 (0.19%)	8 (1.51%)	6 (1.13%)	2 (0.38%)	0 (0%)	23 (4.34%)	
	8 times	5 (0.95%)	2 (0.38%)	3 (0.57%)	2 (0.38%)	0 (0%)	0 (0%)	15 (2.84%)	
	9 times	3 (0.57%)	2 (0.38%)	3 (0.57%)	0 (0%)	1 (0.19%)	0 (0%)	9 (1.70%)	
	10 times	3 (0.57%)	0 (0%)	4 (0.75%)	2 (0.38%)	1 (0.19%)	0 (0%)	10 (1.89%)	
	11 times	0 (0%)	0 (0%)	4 (0.75%)	1 (0.19%)	0 (0%)	0 (0%)	6 (1.13%)	
	12 times	0 (0%)	2 (0.38%)	1 (0.19%)	1 (0.19%)	1 (0.19%)	0 (0%)	5 (0.95%)	
	13 times	0 (0%)	0 (0%)	2 (0.38%)	0 (0%)	1 (0.19%)	0 (0%)	3 (0.57%)	
	14 times	0 (0%)	0 (0%)	1 (0.19%)	0 (0%)	1 (0.19%)	0 (0%)	2 (0.38%)	
	15 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.19%)	0 (0%)	1 (0.19%)	
	16 times	0 (0%)	0 (0%)	2 (0.38%)	0 (0%)	0 (0%)	0 (0%)	2 (0.38%)	
	18 times	0 (0%)	0 (0%)	1 (0.19%)	0 (0%)	1 (0.19%)	0 (0%)	2 (0.38%)	
	19 times	1 (0.19%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.19%)	
	20 times	1 (0.19%)	0 (0%)	1 (0.19%)	0 (0%)	0 (0%)	0 (0%)	2 (0.38%)	
	Total		122 (23.06%)	45 (8.51%)	216 (40.83%)	60 (11.34%)	67 (12.67%)	19 (3.59%)	529 (100%)
Frequency of touching face in 30 min (N = 285)	1 time	23 (8.07%)	6 (2.11%)	47 (16.49%)	9 (3.16%)	12 (4.21%)	2 (0.70%)	99 (34.74%)	
	2 times	16 (5.61%)	7 (2.46%)	38 (13.33%)	10 (3.51%)	14 (4.91%)	3 (1.05%)	88 (30.88%)	
	3 times	7 (2.46%)	2 (0.70%)	20 (7.02%)	6 (2.11%)	3 (1.05%)	5 (1.75%)	43 (15.09%)	
	4 times	5 (1.75%)	2 (0.70%)	6 (2.11%)	1 (0.35%)	4 (1.4%)	0 (0%)	18 (6.31%)	
	5 times	6 (2.11%)	3 (1.05%)	7 (2.46%)	0 (0%)	4 (1.4%)	0 (0%)	20 (7.02%)	
	6 times	4 (1.4%)	3 (1.05%)	5 (1.75%)	0 (0%)	1 (0.35%)	0 (0%)	13 (4.56%)	
	8 times	0 (0%)	0 (0%)	1 (0.35%)	0 (0%)	0 (0%)	0 (0%)	1 (0.35%)	
	9 times	1 (0.35%)	0 (0%)	0 (0%)	1 (0.35%)	1 (0.35%)	0 (0%)	3 (1.05%)	
	Total		62 (21.75%)	23 (8.07%)	124 (43.51%)	27 (9.48%)	39 (13.68%)	10 (3.51%)	285 (100%)
	Frequency of touching other zones in 30 min (N = 155)	1 time	5 (3.23%)	2 (1.29%)	7 (4.52%)	4 (2.58%)	2 (1.29%)	0 (0%)	20 (12.91%)
2 times		4 (2.58%)	1 (0.645%)	3 (1.93%)	2 (1.29%)	0 (0%)	0 (0%)	10 (6.45%)	
3 times		5 (3.23%)	3 (1.93%)	7 (4.52%)	3 (1.93%)	2 (1.29%)	1 (0.645%)	21 (13.54%)	
4 times		3 (1.93%)	1 (0.645%)	4 (2.58%)	1 (0.645%)	0 (0%)	1 (0.645%)	10 (6.45%)	
5 times		5 (3.23%)	1 (0.645%)	2 (1.29%)	4 (2.58%)	2 (1.29%)	1 (0.645%)	15 (9.68%)	
6 times		0 (0%)	0 (0%)	3 (1.93%)	2 (1.29%)	0 (0%)	1 (0.645%)	6 (3.87%)	
7 times		0 (0%)	1 (0.645%)	4 (2.58%)	1 (0.645%)	1 (0.645%)	1 (0.645%)	8 (5.16%)	
8 times		1 (0.645%)	0 (0%)	1 (0.645%)	0 (0%)	0 (0%)	0 (0%)	2 (1.29%)	
9 times		2 (1.29%)	0 (0%)	2 (1.29%)	1 (0.645%)	0 (0%)	0 (0%)	5 (3.23%)	
10 times		2 (1.29%)	2 (1.29%)	3 (1.93%)	2 (1.29%)	4 (2.58%)	1 (0.645%)	14 (9.03%)	
11 times		1 (0.645%)	0 (0%)	1 (0.645%)	0 (0%)	0 (0%)	0 (0%)	2 (1.29%)	
12 times		1 (0.645%)	0 (0%)	4 (2.58%)	0 (0%)	0 (0%)	0 (0%)	5 (3.23%)	
13 times		1 (0.645%)	0 (0%)	1 (0.645%)	0 (0%)	0 (0%)	0 (0%)	2 (1.29%)	
14 times		0 (0%)	0 (0%)	1 (0.645%)	0 (0%)	0 (0%)	0 (0%)	1 (0.645%)	
15 times		1 (0.645%)	2 (1.29%)	4 (2.58%)	0 (0%)	0 (0%)	0 (0%)	7 (4.52%)	
16 times		0 (0%)	0 (0%)	2 (1.29%)	0 (0%)	0 (0%)	0 (0%)	2 (1.29%)	
17 times		2 (1.29%)	0 (0%)	1 (0.645%)	0 (0%)	1 (0.645%)	1 (0.645%)	5 (3.23%)	
18 times		0 (0%)	1 (0.645%)	1 (0.645%)	1 (0.645%)	1 (0.645%)	0 (0%)	4 (2.58%)	
20 times		1 (0.645%)	1 (0.645%)	2 (1.29%)	0 (0%)	0 (0%)	0 (0%)	4 (2.58%)	
21 times		1 (0.645%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.645%)	
22 times		0 (0%)	0 (0%)	0 (0%)	1 (0.645%)	1 (0.645%)	0 (0%)	2 (1.29%)	
24 times		0 (0%)	0 (0%)	1 (0.645%)	0 (0%)	1 (0.645%)	0 (0%)	2 (1.29%)	
25 times		0 (0%)	0 (0%)	1 (0.645%)	0 (0%)	1 (0.645%)	0 (0%)	2 (1.29%)	
27 times		0 (0%)	0 (0%)	0 (0%)	1 (0.645%)	0 (0%)	0 (0%)	1 (0.645%)	
28 times		0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.645%)	0 (0%)	1 (0.645%)	
30 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.645%)	0 (0%)	1 (0.645%)		
39 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.645%)	0 (0%)	1 (0.645%)		
51 times	0 (0%)	0 (0%)	1 (0.645%)	0 (0%)	0 (0%)	0 (0%)	1 (0.645%)		
Total		35 (22.58%)	15 (9.68%)	56 (36.12%)	23 (14.84%)	19 (12.26%)	7 (4.52%)	155 (100%)	

**Supplementary Table 2.** Association of preventive measures followed by the sellers.

Variables	Frequency	Percentage (%)
Wearing a mask (N = 371)		
With gloves	43	6.14%
Without gloves	328	46.86%
Not wearing a mask (N = 329)		
And wearing gloves	7	1%
And without wearing gloves	322	46%
Total	700	100%
Wearing a mask (N = 371)		
And using a disinfectant at least once	100	14.29%
Without using a disinfectant	271	38.71%
Not wearing a mask (N = 329)		
And using a disinfectant at least once	17	2.43%
And without using a disinfectant	312	44.57%
Total	700	100%

Variables	Frequency	Percentage (%)
Wearing a well fitted mask (N = 163)	71	19.13%
And using a disinfectant at least once	92	24.80%
Without using a disinfectant	29	7.82%
Wearing an ill fitted mask (N = 208)	179	48.25%
And using a disinfectant at least once	371	100%
Without using a disinfectant	81	11.57%
Total	290	41.43%
Wearing a mask (N = 371)	71	10.14%
With practicing physical distancing	258	36.86%
Without practicing physical distancing	700	100%
Not wearing a mask (N = 329)	42	11.32%
But practicing physical distancing	121	32.61%
And without practicing physical distancing	39	10.51%
Total	169	45.56%
Wearing a well fitted mask (N = 163)	371	100%
With practicing physical distancing	30	4.28%
Without practicing physical distancing	70	10%
Wearing a fitted mask (N = 208)	51	7.29%
With practicing physical distancing	220	31.43%
Without practicing physical distancing	6	0.86%
Total	11	1.57%
Wearing a mask (N = 371)	65	9.29%
With using a disinfectant at least once and practicing physical distancing	247	35.28%
Without using a disinfectant and practicing physical distancing	700	100%
Without using a disinfectant and no practice of physical distancing	23	6.20%
Not wearing a mask (N = 329)	48	12.94%
But using a disinfectant at least once and practicing physical distancing	19	5.12%
But using a disinfectant at least once and no practice of physical distancing	73	19.68%
And without using a disinfectant but practicing physical distancing	8	2.16%
And without using a disinfectant and no practice of physical distancing	21	5.66%
Total	32	8.62%
Wearing a well fitted mask (N = 163)	147	39.62%
With using a disinfectant at least once and practicing physical distancing	371	100%
Without using a disinfectant and practicing physical distancing	71	10.14%
Without using a disinfectant and no practice of physical distancing	29	4.14%
Wearing an ill-fitted mask (N = 208)	17	2.43%
With using a disinfectant at least once and practicing physical distancing	92	13.14%
Without using a disinfectant and practicing physical distancing	179	25.57%
Without using a disinfectant and no practice of physical distancing	312	44.58%
Total	700	100%
Using a disinfectant at least once (N = 117)	37	5.29%
Wearing a well fitted mask	80	11.43%
Wearing an ill-fitted mask	116	16.57%
Without wearing a mask	467	66.71%
Not using a disinfectant (N = 583)	700	100%
But wearing a well fitted mask	23	3.29%
But wearing an ill fitted mask	48	6.86%
And without wearing a mask	8	1.14%
Total	21	3%
Using a disinfectant at least once (N = 117)	6	0.86%
Wearing a well fitted mask with practice of physical distancing	11	1.57%
Wearing a well-fitted mask without practicing physical distancing	19	2.71%
Wearing an ill-fitted mask with practice of physical distancing	73	10.43%
Wearing an ill-fitted mask without practicing physical distancing	32	4.57%
Without wearing a mask with practice of physical distancing	147	21%
Without wearing a mask and without practicing physical distancing	65	9.29%
Total	247	35.28%
Using a disinfectant at least once (N = 117)	700	100%
Wearing a well-fitted mask with practice of physical distancing and having no contact with people	7	1%
Wearing a well-fitted mask with practice of physical distancing and having contact with people	16	2.29%
Wearing a well-fitted mask without practicing physical distancing having no contact with people	6	0.86%
Wearing a well-fitted mask without practicing physical distancing and having contact with people	42	6%
Wearing an ill-fitted mask with practice of physical distancing and having no contact with people	0	0%
Wearing an ill-fitted mask with practice of physical distancing and having contact with people	7	1%
Wearing an ill-fitted mask without practicing physical distancing and having no contact with people	1	0.14%
Wearing an ill-fitted mask without practicing physical distancing and having contact with people	21	3%
Without wearing a mask with practice of physical distancing and having no contact with people	1	0.14%
Without wearing a mask with practice of physical distancing and having contact with people	5	0.72%
Without wearing a mask and without practicing physical and having no contact with people	4	0.57%
Without wearing a mask and without practicing physical and having contact with people	7	1%
Not using a disinfectant (N = 583)	7	1%
Wearing a well-fitted mask with practice of physical distancing and having no contact with people	12	1.71%
Wearing a well-fitted mask with practice of physical distancing and having contact with people	15	2.14%
Wearing a well-fitted mask without practicing physical distancing and having no contact with people	58	8.29%
Wearing a well-fitted mask without practicing physical distancing and having contact with people	7	1%
Wearing an ill-fitted mask with practice of physical distancing and having no contact with people	25	3.57%
Wearing an ill-fitted mask with practice of physical distancing and having contact with people		

Variables	Frequency	Percentage (%)
Wearing an ill-fitted mask without practicing physical distancing and having no contact with people	12	1.71%
Wearing an ill-fitted mask without practicing physical distancing and having contact with people	135	19.29%
Without wearing a mask with practice of physical distancing and having no contact with people	19	2.72%
Without wearing a mask with practice of physical distancing and having contact with people	46	6.57%
Without wearing a mask and without practicing physical distancing and having no contact with people	27	3.86%
Without wearing a mask and without practicing physical distancing and having contact with people	220	31.42%
Total	700	100%

Supplementary Table 3. Facial touching according to age and gender.

Age	Young		Middle-aged		Older		Total		
	M	F	M	F	M	F			
Gender									
Touching mucous area									
Eyes	Yes	102 (14.57%)	40 (5.71%)	199 (28.43%)	57 (8.15%)	67 (9.57%)	18 (2.57%)	483 (69%)	
	No	51 (7.29%)	30 (4.29%)	83 (11.86%)	23 (3.28%)	23 (3.28%)	7 (1%)	217 (31%)	
Total		153 (21.86%)	70 (10%)	282 (40.29%)	80 (11.43%)	90 (12.85%)	25 (3.57%)	700 (100%)	
Nose	Yes	122 (17.43%)	45 (6.43%)	214 (30.57%)	55 (7.86%)	64 (9.14%)	17 (2.43%)	517 (73.86%)	
	No	31 (4.43%)	25 (3.57%)	68 (9.72%)	25 (3.57%)	26 (3.71%)	8 (1.14%)	183 (26.14%)	
Total		153 (21.86%)	70 (10%)	282 (40.29%)	80 (11.43%)	90 (12.85%)	25 (3.57%)	700 (100%)	
Mouth	Yes	102 (14.57%)	40 (5.71%)	198 (28.29%)	40 (5.71%)	62 (8.85%)	17 (2.43%)	459 (65.57%)	
	No	51 (7.29%)	30 (4.29%)	84 (12%)	40 (5.71%)	28 (4%)	8 (1.14%)	241 (34.43%)	
Total		153 (21.86%)	70 (10%)	282 (40.29%)	80 (11.43%)	90 (12.85%)	25 (3.57%)	700 (100%)	
Touching non-mucous area	Yes	55 (7.86%)	20 (2.86%)	90 (12.85%)	30 (4.29%)	38 (5.43%)	12 (1.71%)	245 (35%)	
	No	98 (14%)	50 (7.14%)	192 (27.44%)	50 (7.14%)	52 (7.42%)	13 (1.86%)	455 (65%)	
Total		153 (21.86%)	70 (10%)	282 (40.29%)	80 (11.43%)	90 (12.85%)	25 (3.57%)	700 (100%)	
Zone of touching non-mucous area (N = 245)	Ears	3 (1.22%)	0 (0%)	3 (1.22%)	1 (0.41%)	1 (0.41%)	1 (0.41%)	9 (3.67%)	
	Hair	2 (0.82%)	0 (0%)	2 (0.82%)	2 (0.82%)	3 (1.22%)	0 (0%)	9 (3.67%)	
	Arms	0 (0%)	0 (0%)	2 (0.82%)	0 (0%)	0 (0%)	0 (0%)	2 (0.82%)	
	Other non-mucous area	50 (20.41%)	20 (8.20%)	83 (33.88%)	27 (11.02%)	34 (13.88%)	11 (4.49%)	225 (91.84%)	
Total		55 (22.44%)	20 (8.20%)	90 (36.73%)	30 (12.24%)	38 (15.51%)	12 (4.89%)	245 (100%)	
Frequency of touching eyes in 30 min (N = 483)	1 time	24 (4.97%)	13 (2.69%)	56 (11.60%)	10 (2.08%)	16 (3.31%)	4 (0.82%)	123 (25.47%)	
	2 times	27 (5.60%)	2 (0.41%)	50 (10.36%)	16 (3.31%)	13 (2.69%)	8 (1.65%)	116 (24.02%)	
	3 times	17 (3.52%)	10 (2.08%)	36 (7.45%)	8 (1.65%)	11 (2.28%)	3 (0.62%)	85 (17.6%)	
	4 times	13 (2.69%)	7 (1.46%)	23 (4.76%)	9 (1.86%)	9 (1.86%)	1 (0.21%)	62 (12.84%)	
	5 times	8 (1.65%)	3 (0.62%)	16 (3.31%)	1 (0.21%)	8 (1.65%)	0 (0%)	36 (7.45%)	
	6 times	6 (1.24%)	2 (0.41%)	7 (1.46%)	4 (0.82%)	3 (0.62%)	0 (0%)	22 (4.55%)	
	7 times	1 (0.21%)	1 (0.21%)	3 (0.62%)	2 (0.41%)	2 (0.41%)	0 (0%)	9 (1.86%)	
	8 times	4 (0.82%)	2 (0.41%)	5 (1.06%)	4 (0.82%)	1 (0.21%)	2 (0.41%)	18 (3.73%)	
	9 times	1 (0.21%)	0 (0%)	0 (0%)	1 (0.21%)	0 (0%)	0 (0%)	2 (0.41%)	
	10 times	1 (0.21%)	0 (0%)	1 (0.21%)	1 (0.21%)	3 (0.61%)	0 (0%)	6 (1.24%)	
	13 times	0 (0%)	0 (0%)	1 (0.21%)	1 (0.21%)	0 (0%)	0 (0%)	2 (0.41%)	
	14 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.21%)	0 (0%)	1 (0.21%)	
	16 times	0 (0%)	0 (0%)	1 (0.21%)	0 (0%)	0 (0%)	0 (0%)	1 (0.21%)	
	Total		102 (21.12%)	40 (8.29%)	199 (41.21%)	57 (11.79%)	67 (13.87%)	18 (3.72%)	483 (100%)
	Frequency of touching nose in 30 min (N = 517)	1 time	32 (6.19%)	17 (3.29%)	64 (12.38%)	16 (3.10%)	13 (2.51%)	3 (0.58%)	145 (28.05%)
		2 times	37 (7.15%)	8 (1.55%)	49 (9.48%)	17 (3.29%)	16 (3.10%)	4 (0.77%)	131 (25.34%)
3 times		25 (4.84%)	6 (1.16%)	50 (9.67%)	9 (1.74%)	10 (1.94%)	4 (0.77%)	104 (20.12%)	
4 times		13 (2.51%)	6 (1.16%)	21 (4.06%)	3 (0.58%)	6 (1.16%)	2 (0.39%)	51 (9.86%)	
5 times		9 (1.74%)	5 (0.97%)	14 (2.71%)	5 (0.97%)	4 (0.77%)	1 (0.19%)	38 (7.35%)	
6 times		3 (0.58%)	1 (0.19%)	5 (0.97%)	1 (0.19%)	7 (1.35%)	1 (0.19%)	18 (3.48%)	
7 times		1 (0.19%)	2 (0.39%)	1 (0.19%)	2 (0.39%)	1 (0.19%)	1 (0.19%)	8 (1.56%)	
8 times		0 (0%)	0 (0%)	3 (0.58%)	0 (0%)	3 (0.58%)	1 (0.19%)	7 (1.35%)	
9 times		1 (0.19%)	0 (0%)	2 (0.39%)	0 (0%)	0 (0%)	0 (0%)	3 (0.58%)	
10 times		0 (0%)	0 (0%)	2 (0.39%)	2 (0.39%)	3 (0.58%)	0 (0%)	7 (1.35%)	
12 times		0 (0%)	0 (0%)	1 (0.19%)	0 (0%)	0 (0%)	0 (0%)	1 (0.19%)	
13 times		1 (0.19%)	0 (0%)	2 (0.39%)	0 (0%)	0 (0%)	0 (0%)	3 (0.58%)	
14 times		0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.19%)	0 (0%)	1 (0.19%)	
Total			122 (23.60%)	45 (8.70%)	214 (41.39%)	55 (10.64%)	64 (12.38%)	17 (3.29%)	517 (100%)
Frequency of touching mouth in 30 min (N = 459)		1 time	22 (4.79%)	10 (2.18%)	45 (9.80%)	11 (2.40%)	12 (2.62%)	3 (0.65%)	103 (22.44%)
		2 times	29 (6.31%)	10 (2.18%)	57 (12.42%)	6 (1.31%)	15 (3.26%)	7 (1.53%)	124 (27.01%)
	3 times	20 (4.36%)	4 (0.87%)	26 (5.66%)	9 (1.96%)	10 (2.18%)	4 (0.87%)	73 (15.9%)	
	4 times	11 (2.40%)	7 (1.53%)	16 (3.49%)	5 (1.09%)	9 (1.96%)	0 (0%)	58 (12.64%)	
	5 times	6 (1.31%)	4 (0.87%)	4 (0.87%)	2 (0.436%)	5 (1.09%)	1 (0.218%)	34 (7.41%)	
	6 times	0 (0%)	2 (0.436%)	11(2.40%)	2 (0.436%)	2 (0.436%)	1 (0.218%)	18 (3.92%)	
	7 times	5 (1.09%)	1 (0.218%)	6 (1.31%)	1 (0.218%)	1 (0.218%)	0 (0%)	14 (3.05%)	
	8 times	1 (0.218%)	0 (0%)	1 (0.218%)	1 (0.218%)	0 (0%)	0 (0%)	3 (0.65%)	
	9 times	1 (0.218%)	0 (0%)	4 (0.87%)	1 (0.218%)	1 (0.218%)	0 (0%)	7 (1.53%)	
	10 times	1 (0.218%)	1 (0.218%)	1 (0.218%)	0 (0%)	2 (0.436%)	0 (0%)	5 (1.09%)	
	11 times	0 (0%)	0 (0%)	2 (0.436%)	1 (0.218%)	2 (0.436%)	0 (0%)	5 (1.09%)	
	12 times	4 (0.87%)	0 (0%)	1 (0.218%)	0 (0%)	1 (0.218%)	0 (0%)	6 (1.31%)	
	13 times	2 (0.436%)	0 (0%)	1 (0.218%)	0 (0%)	1 (0.218%)	0 (0%)	4 (0.87%)	
	14 times	0 (0%)	0 (0%)	0 (0%)	1 (0.218%)	1 (0.218%)	0 (0%)	2 (0.436%)	
	16 times	0 (0%)	1 (0.218%)	1 (0.218%)	0 (0%)	0 (0%)	1 (0.218%)	3 (0.65%)	
	Total		102 (22.22%)	40 (8.72%)	198 (43.14%)	40 (8.72%)	62 (13.50%)	17 (3.70%)	459 (100%)
Frequency of touching non-mucous area in 30 min (N = 245)	1 time	10 (4.08%)	3 (1.22%)	21 (8.57%)	10 (4.08%)	5 (2.04%)	1 (0.41%)	50 (20.40%)	
	2 times	14 (5.71%)	7 (2.86%)	33 (13.46%)	10 (4.08%)	8 (3.27%)	7 (2.86%)	79 (32.24%)	
	3 times	9 (3.67%)	4 (1.63%)	16 (6.53%)	1 (0.41%)	7 (2.86%)	0 (0%)	37 (15.1%)	
	4 times	8 (3.27%)	3 (1.22%)	2 (0.82%)	1 (0.41%)	6 (2.44%)	1 (0.41%)	21 (8.57%)	
	5 times	3 (1.22%)	2 (0.816%)	2 (0.816%)	1 (0.41%)	5 (2.04%)	0 (0%)	13 (5.31%)	
	6 times	1 (0.41%)	0 (0%)	7 (2.86%)	2 (0.82%)	1 (0.41%)	0 (0%)	11 (4.49%)	
	7 times	2 (0.82%)	0 (0%)	3 (1.22%)	1 (0.41%)	1 (0.41%)	0 (0%)	7 (2.86%)	
	8 times	4 (1.63%)	1 (0.408%)	0 (0%)	4 (1.63%)	1 (0.41%)	0 (0%)	10 (4.08%)	
	9 times	1 (0.41%)	0 (0%)	1 (0.41%)	0 (0%)	2 (0.82%)	1 (0.41%)	5 (2.04%)	
	10 times	0 (0%)	0 (0%)	2 (0.82%)	0 (0%)	2 (0.82%)	1 (0.41%)	5 (2.04%)	
	11 times	1 (0.41%)	0 (0%)	1 (0.41%)	0 (0%)	0 (0%)	0 (0%)	2 (0.82%)	
	12 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.41%)	1 (0.41%)	
	13 times	1 (0.408%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.41%)	
	14 times	1 (0.408%)	0 (0%)	1 (0.408%)	0 (0%)	0 (0%)	0 (0%)	2 (0.82%)	
	15 times	0 (0%)	0 (0%)	1 (0.408%)	0 (0%)	0 (0%)	0 (0%)	1 (0.41%)	
	Total		55 (22.45%)	20 (8.16%)	90 (36.74%)	30 (12.25%)	38 (15.51%)	12 (4.89%)	245 (100%)



Age Gender	Young		Middle-aged		Older		Total		
	M	F	M	F	M	F			
Total Frequency of touching cardboard in 30 min (N = 298)	35 times	0 (0%)	0 (0%)	1 (0.248%)	0 (0%)	0 (0%)	0 (0%)	1 (0.25%)	
	36 times	1 (0.248%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.25%)	
	41 times	0 (0%)	0 (0%)	1 (0.248%)	0 (0%)	0 (0%)	0 (0%)	1 (0.25%)	
	69 times	0 (0%)	0 (0%)	1 (0.248%)	0 (0%)	0 (0%)	0 (0%)	1 (0.25%)	
	Total	79 (19.651%)	41 (10.20%)	176 (43.781%)	48 (11.94%)	42 (10.45%)	16 (3.98%)	402 (100%)	
	1 time	7 (2.35%)	4 (1.34%)	7 (2.35%)	5 (1.68%)	6(2.013%)	2 (0.67%)	31 (10.41%)	
	2 times	7 (2.35%)	5 (1.68%)	11 (3.69%)	6 (2.01%)	4 (1.34%)	2 (0.67%)	35 (11.75%)	
	3 times	9 (3.02%)	6 (2.01%)	15 (5.03%)	4 (1.34%)	4 (1.34%)	1 (0.335%)	39 (13.09%)	
	4 times	9 (3.02%)	2 (0.67%)	23 (7.21%)	2 (0.67%)	3 (1.01%)	3 (1.01%)	42 (14.093%)	
	5 times	6 (2.01%)	3 (1.01%)	11 (3.69%)	5 (1.68%)	0 (0%)	0 (0%)	25 (8.39%)	
	6 times	1 (0.335%)	1 (0.335%)	13 (4.36%)	4 (1.34%)	2 (0.67%)	2 (0.67%)	23 (7.72%)	
	7 times	4 (1.34%)	2 (0.67%)	8 (2.69%)	2 (0.67%)	0 (0%)	0 (0%)	16 (5.37%)	
	8 times	3 (1.01%)	0 (0%)	4 (1.34%)	2 (0.67%)	2 (0.67%)	0 (0%)	11 (3.69%)	
	9 times	0 (0%)	2 (0.67%)	8 (2.69%)	2 (0.67%)	2 (0.67%)	1 (0.335%)	15 (5.03%)	
	10 times	4 (1.34%)	1 (0.335%)	2 (0.67%)	3 (1.01%)	2 (0.67%)	1 (0.335%)	13 (4.36%)	
	11 times	0 (0%)	2 (0.67%)	3 (1.01%)	0 (0%)	0 (0%)	0 (0%)	5 (1.68%)	
	12 times	2 (0.67%)	0 (0%)	3 (1.01%)	2 (0.67%)	1 (0.335%)	1 (0.335%)	9 (3%)	
	13 times	1 (0.335%)	1 (0.335%)	1 (0.335%)	0 (0%)	1 (0.335%)	0 (0%)	4 (1.34%)	
	14 times	0 (0%)	1 (0.335%)	2 (0.67%)	1 (0.335%)	0 (0%)	0 (0%)	4 (1.34%)	
	15 times	1 (0.335%)	1 (0.335%)	3 (1.01%)	0 (0%)	0 (0%)	1 (0.335%)	6 (2.01%)	
	16 times	0 (0%)	0 (0%)	1 (0.335%)	0 (0%)	0 (0%)	1 (0.335%)	2 (0.67%)	
	17 times	1 (0.335%)	0 (0%)	1 (0.335%)	1 (0.335%)	1 (0.335%)	0 (0%)	4 (1.34%)	
	18 times	0 (0%)	0 (0%)	0 (0%)	1 (0.335%)	0 (0%)	0 (0%)	1 (0.335%)	
	20 times	0 (0%)	0 (0%)	2 (0.67%)	0 (0%)	1 (0.335%)	0 (0%)	3 (1%)	
	21 times	0 (0%)	0 (0%)	1 (0.335%)	0 (0%)	0 (0%)	0 (0%)	1 (0.335%)	
	22 times	1 (0.335%)	0 (0%)	1 (0.335%)	1 (0.335%)	0 (0%)	0 (0%)	3 (1%)	
	25 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.335%)	
	29 times	0 (0%)	0 (0%)	0 (0%)	1 (0.335%)	0 (0%)	0 (0%)	1 (0.335%)	
	30 times	0 (0%)	0 (0%)	0 (0%)	1 (0.335%)	0 (0%)	0 (0%)	1 (0.335%)	
	32 times	0 (0%)	0 (0%)	0 (0%)	1 (0.335%)	0 (0%)	0 (0%)	1 (0.335%)	
	37 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.335%)	0 (0%)	1 (0.335%)	
	38 times	0 (0%)	0 (0%)	1 (0.335%)	0 (0%)	0 (0%)	0 (0%)	1 (0.335%)	
	Total	56 (18.79%)	31 (10.41%)	121 (40.61%)	45 (15.10%)	30 (10.07%)	15 (5.03%)	298 (100%)	
	Total Frequency of touching metals other than money in 30 minutes (N = 447)	1 time	1 (0.22%)	4 (0.89%)	12(2.68%)	4 (0.89%)	4 (0.89%)	2 (0.45%)	27 (6.04%)
		2 times	9 (2.01%)	5 (1.12%)	15 (3.36%)	5 (1.12%)	3 (0.67%)	2 (0.45%)	39 (8.73%)
		3 times	8 (1.79%)	6 (1.34%)	12 (2.68%)	5 (1.12%)	2 (0.45%)	0 (0%)	33 (7.38%)
		4 times	13 (2.91%)	3 (0.67%)	18 (4.03%)	2 (0.45%)	7 (1.57%)	1 (0.22%)	44 (9.85%)
		5 times	7 (1.57%)	5 (1.12%)	16 (3.58%)	4 (0.89%)	3 (0.67%)	2 (0.45%)	37 (8.28%)
6 times		6 (1.34%)	4 (0.89%)	15 (3.36%)	4 (0.89%)	4 (0.89%)	1 (0.22%)	34 (7.60%)	
7 times		4 (0.89%)	3 (0.67%)	15 (3.36%)	5 (1.12%)	4 (0.89%)	2 (0.45%)	33 (7.38%)	
8 times		3 (0.67%)	1 (0.22%)	13 (2.91%)	1 (0.22%)	4 (0.89%)	1 (0.22%)	23 (5.15%)	
9 times		1 (0.22%)	2 (0.45%)	8 (1.79%)	2 (0.45%)	6 (1.34%)	0 (0%)	19 (4.25%)	
10 times		4 (0.89%)	3 (0.67%)	10(2.24%)	1 (0.22%)	5 (1.12%)	0 (0%)	23 (5.15%)	
11 times		6 (1.34%)	1 (0.22%)	7 (1.57%)	0 (0%)	1 (0.22%)	0 (0%)	15 (3.36%)	
12 times		4 (0.89%)	2 (0.45%)	1 (0.22%)	4 (0.89%)	4 (0.89%)	0 (0%)	15 (3.36%)	
13 times		2 (0.45%)	0 (0%)	5 (1.12%)	5 (1.12%)	1 (0.22%)	0 (0%)	13 (2.91%)	
14 times		3 (0.67%)	1 (0.22%)	3 (0.67%)	1 (0.22%)	0 (0%)	0 (0%)	8 (1.79%)	
15 times		3 (0.67%)	1 (0.22%)	6 (1.34%)	2 (0.45%)	0 (0%)	1 (0.22%)	13 (2.91%)	
16 times		3 (0.67%)	0 (0%)	5 (1.12%)	0 (0%)	1 (0.22%)	0 (0%)	9 (2.01%)	
17 times		2 (0.45%)	0 (0%)	2 (0.45%)	1 (0.22%)	2 (0.45%)	0 (0%)	7 (1.57%)	
18 times		3 (0.67%)	1 (0.22%)	1 (0.22%)	0 (0%)	1 (0.22%)	0 (0%)	6 (1.34%)	
19 times		2 (0.45%)	0 (0%)	2 (0.45%)	0 (0%)	0 (0%)	0 (0%)	4 (0.89%)	
20 times		4 (0.89%)	0 (0%)	5 (1.12%)	1 (0.22%)	1 (0.22%)	0 (0%)	11 (2.46%)	
21 times		0 (0%)	1 (0.22%)	2 (0.45%)	0 (0%)	0 (0%)	0 (0%)	3 (0.67%)	
22 times		0 (0%)	0 (0%)	2 (0.45%)	0 (0%)	1 (0.22%)	0 (0%)	3 (0.67%)	
23 times		1 (0.22%)	0 (0%)	0 (0%)	1 (0.22%)	0 (0%)	0 (0%)	2 (0.45%)	
24 times		1 (0.22%)	0 (0%)	2 (0.45%)	0 (0%)	0 (0%)	0 (0%)	3 (0.67%)	
25 times		1 (0.22%)	0 (0%)	3 (0.67%)	0 (0%)	1 (0.22%)	0 (0%)	5 (1.12%)	
26 times		1 (0.22%)	0 (0%)	0 (0%)	0 (0%)	1 (0.22%)	0 (0%)	2 (0.45%)	
27 times		0 (0%)	0 (0%)	2 (0.45%)	0 (0%)	0 (0%)	0 (0%)	2 (0.45%)	
29 times		0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.22%)	0 (0%)	1 (0.22%)	
31 times		0 (0%)	0 (0%)	1 (0.22%)	0 (0%)	0 (0%)	0 (0%)	1 (0.22%)	
32 times		0 (0%)	0 (0%)	1 (0.22%)	1 (0.22%)	0 (0%)	0 (0%)	2 (0.45%)	
33 times		0 (0%)	0 (0%)	1 (0.22%)	0 (0%)	0 (0%)	0 (0%)	1 (0.22%)	
34 times		0 (0%)	0 (0%)	1 (0.22%)	0 (0%)	0 (0%)	0 (0%)	1 (0.22%)	
35 times		0 (0%)	0 (0%)	1 (0.22%)	0 (0%)	0 (0%)	0 (0%)	1 (0.22%)	
38 times		0 (0%)	0 (0%)	1 (0.22%)	0 (0%)	1 (0.22%)	0 (0%)	2 (0.45%)	
40 times		0 (0%)	0 (0%)	1 (0.22%)	0 (0%)	0 (0%)	0 (0%)	1 (0.22%)	
44 times		0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (0.45%)	0 (0%)	2 (0.45%)	
48 times		1 (0.22%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.22%)	
51 times		0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.22%)	0 (0%)	1 (0.22%)	
Total	93 (20.81%)	43 (9.62%)	189 (42.28%)	49 (10.96%)	61 (13.65%)	12 (2.68%)	447 (100%)		
Total Frequency of touching money in 30 min (N = 536)	1 time	8 (1.49%)	2 (0.37%)	6 (1.12%)	3 (0.56%)	6 (1.12%)	1 (0.186%)	26 (4.85%)	
	2 times	11 (2.05%)	3 (0.56%)	10 (1.86%)	4 (0.75%)	7 (1.31%)	2 (0.37%)	37 (6.90%)	
	3 times	12 (2.24%)	4 (0.75%)	20 (3.73%)	7 (1.31%)	2 (0.37%)	3 (0.56%)	48 (8.96%)	
	4 times	9 (1.68%)	2 (0.37%)	27 (5.04%)	5 (0.93%)	9 (1.68%)	1 (0.186%)	53 (9.89%)	
	5 times	11 (2.05%)	5 (0.93%)	23 (4.29%)	3 (0.56%)	0 (0%)	0 (0%)	42 (7.84%)	
	6 times	13 (2.43%)	7 (1.31%)	30 (5.60%)	10 (1.86%)	11 (2.05%)	1 (0.186%)	72 (13.43%)	
	7 times	6 (1.12%)	1 (0.186%)	15 (2.80%)	5 (0.93%)	5 (0.93%)	1 (0.186%)	33 (6.16%)	
	8 times	10 (1.86%)	2 (0.37%)	21 (3.92%)	4 (0.75%)	10 (1.86%)	1 (0.186%)	48 (8.96%)	
	9 times	1 (0.186%)	3 (0.56%)	9 (1.68%)	3 (0.56%)	6 (1.12%)	3 (0.56%)	25 (4.66%)	
	10 times	9 (1.68%)	7 (1.31%)	22 (4.10%)	6 (1.12%)	4 (0.75%)	0 (0%)	48 (8.96%)	
	11 times	3 (0.56%)	0 (0%)	7 (1.31%)	1 (0.186%)	1 (0.186%)	0 (0%)	12 (2.24%)	
	12 times	3 (0.56%)	1 (0.186%)	10 (1.86%)	1 (0.186%)	2 (0.37%)	1 (0.186%)	18 (3.36%)	
	13 times	0 (0%)	1 (0.186%)	2 (0.37%)	1 (0.186%)	3 (0.56%)	1 (0.186%)	8 (1.49%)	
	14 times	3 (0.56%)	1 (0.186%)	6 (1.12%)	2 (0.37%)	2 (0.37%)	0 (0%)	14 (2.61%)	
	15 times	4 (0.75%)	0 (0%)	7 (1.31%)	2 (0.37%)	1 (0.186%)	1 (0.186%)	15 (2.80%)	
	16 times	1 (0.186%)	0 (0%)	5 (0.93%)	0 (0%)	2 (0.37%)	1 (0.186%)	9 (1.68%)	
	17 times	2 (0.37%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (0.37%)	
	18 times	1 (0.186%)	0 (0%)	2 (0.37%)	1 (0.186%)	0 (0%)	0 (0%)	4 (0.75%)	
	19 times	0 (0%)	0 (0%)	2 (0.37%)	0 (0%)	2 (0.37%)	0 (0%)	4 (0.75%)	
	20 times	4 (0.75%)	0 (0%)	2 (0.37%)	1 (0.186%)	1 (0.186%)	0 (0%)	8 (1.49%)	
	21 times	0 (0%)	0 (0%)	1 (0.186%)	1 (0.186%)	1 (0.186%)	0 (0%)	3 (0.56%)	

Age Gender	Young		Middle-aged		Older		Total	
	M	F	M	F	M	F		
Total Frequency of touching mobile phone in 30 minutes (N = 478)	24 times	0 (0%)	0 (0%)	1 (0.186%)	0 (0%)	0 (0%)	0 (0%)	1 (0.186%)
	26 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.186%)	0 (0%)	1 (0.186%)
	29 times	0 (0%)	0 (0%)	1 (0.186%)	1 (0.186%)	0 (0%)	0 (0%)	2 (0.37%)
	31 times	0 (0%)	0 (0%)	1 (0.186%)	0 (0%)	0 (0%)	0 (0%)	1 (0.186%)
	37 times	0 (0%)	0 (0%)	1 (0.186%)	0 (0%)	1 (0.186%)	0 (0%)	2 (0.37%)
	Total	111 (20.71%)	39 (7.28%)	231 (43.09%)	61 (11.38%)	77 (14.37%)	17 (3.17%)	536 (100%)
	1 time	21 (4.39%)	15 (3.14%)	43 (9%)	19 (3.98%)	13 (2.72%)	5 (1.04%)	116 (24.27%)
	2 times	25 (5.23%)	12 (2.52%)	62 (12.97%)	19 (3.98%)	9 (1.88%)	3 (0.63%)	130 (27.29%)
	3 times	15 (3.14%)	8 (1.67%)	21 (4.39%)	10 (2.09%)	3 (0.63%)	1 (0.21%)	58 (12.13%)
	4 times	13 (2.72%)	5 (1.05%)	13 (2.72%)	4 (0.84%)	6 (1.25%)	2 (0.42%)	43 (9%)
	5 times	13 (2.72%)	8 (1.67%)	7 (1.46%)	3 (0.63%)	2 (0.42%)	2 (0.42%)	35 (7.32%)
	6 times	3 (0.63%)	1 (0.21%)	11 (2.30%)	2 (0.42%)	4 (0.84%)	0 (0%)	21 (4.39%)
	7 times	6 (1.25%)	4 (0.84%)	9 (1.88%)	2 (0.42%)	0 (0%)	1 (0.21%)	22 (4.60%)
	8 times	3 (0.63%)	1 (0.21%)	5 (1.04%)	2 (0.42%)	1 (0.21%)	0 (0%)	12 (2.51%)
	9 times	2 (0.42%)	0 (0%)	2 (0.42%)	0 (0%)	1 (0.21%)	1 (0.21%)	6 (1.25%)
	10 times	3 (0.63%)	0 (0%)	3 (0.63%)	3 (0.63%)	0 (0%)	0 (0%)	9 (1.88%)
	11 times	1 (0.21%)	1 (0.21%)	0 (0%)	1 (0.21%)	0 (0%)	0 (0%)	3 (0.63%)
12 times	1 (0.21%)	0 (0%)	0 (0%)	1 (0.21%)	0 (0%)	0 (0%)	2 (0.42%)	
13 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.21%)	0 (0%)	1 (0.21%)	
15 times	3 (0.63%)	1 (0.21%)	7 (1.46%)	2 (0.42%)	1 (0.21%)	1 (0.21%)	15 (3.14%)	
18 times	0 (0%)	1 (0.21%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.21%)	
20 times	2 (0.42%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (0.42%)	
21 times	1 (0.21%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.21%)	
35 times	0 (0%)	0 (0%)	1 (0.21%)	0 (0%)	0 (0%)	0 (0%)	1 (0.21%)	
Total	112 (23.43%)	57 (11.92%)	184 (38.49%)	68 (14.23%)	41 (8.58%)	16 (3.35%)	478 (100%)	
Frequency of touching fruits and vegetables (N = 345)	1 time	1 (0.29%)	0 (0%)	4 (1.16%)	0 (0%)	1 (0.29%)	0 (0%)	6 (1.74%)
	2 times	1 (0.29%)	2 (0.58%)	8 (2.32%)	0 (0%)	2 (0.58%)	2 (0.58%)	15 (4.35%)
	3 times	7 (2.03%)	1 (0.29%)	6 (1.74%)	1 (0.29%)	4 (1.16%)	3 (0.87%)	22 (6.38%)
	4 times	7 (2.03%)	1 (0.29%)	5 (1.45%)	4 (1.16%)	3 (0.87%)	1 (0.29%)	21 (6.09%)
	5 times	3 (0.87%)	1 (0.29%)	8 (2.32%)	1 (0.29%)	1 (0.29%)	1 (0.29%)	15 (4.35%)
	6 times	5 (1.45%)	1 (0.29%)	5 (1.45%)	1 (0.29%)	3 (0.87%)	1 (0.29%)	16 (4.64%)
	7 times	7 (2.03%)	2 (0.58%)	11 (3.19%)	3 (0.87%)	3 (0.87%)	0 (0%)	26 (7.54%)
	8 times	6 (1.74%)	2 (0.58%)	12 (3.48%)	4 (1.16%)	2 (0.58%)	0 (0%)	26 (7.54%)
	9 times	5 (1.45%)	1 (0.29%)	7 (2.03%)	1 (0.29%)	0 (0%)	2 (0.58%)	16 (4.64%)
	10 times	3 (0.87%)	1 (0.29%)	19 (5.51%)	2 (0.58%)	1 (0.29%)	0 (0%)	26 (7.54%)
	11 times	2 (0.58%)	2 (0.58%)	14 (4.06%)	2 (0.58%)	3 (0.87%)	0 (0%)	23 (6.67%)
	12 times	1 (0.29%)	0 (0%)	11 (3.19%)	2 (0.58%)	4 (1.16%)	1 (0.29%)	19 (5.51%)
	13 times	0 (0%)	1 (0.29%)	3 (0.87%)	1 (0.29%)	0 (0%)	0 (0%)	5 (1.45%)
	14 times	1 (0.29%)	0 (0%)	4 (1.16%)	1 (0.29%)	6 (1.74%)	0 (0%)	12 (3.48%)
	15 times	2 (0.58%)	1 (0.29%)	5 (1.45%)	2 (0.58%)	2 (0.58%)	1 (0.29%)	13 (3.77%)
	16 times	0 (0%)	0 (0%)	3 (0.87%)	1 (0.29%)	0 (0%)	0 (0%)	4 (1.16%)
	17 times	1 (0.29%)	0 (0%)	5 (1.45%)	1 (0.29%)	3 (0.87%)	1 (0.29%)	11 (3.19%)
	18 times	0 (0%)	0 (0%)	4 (1.16%)	0 (0%)	3 (0.87%)	1 (0.29%)	8 (2.32%)
	19 times	2 (0.58%)	0 (0%)	1 (0.29%)	0 (0%)	1 (0.29%)	0 (0%)	4 (1.16%)
	20 times	2 (0.58%)	1 (0.29%)	5 (1.45%)	3 (0.87%)	3 (0.87%)	0 (0%)	14 (4.06%)
	21 times	0 (0%)	0 (0%)	4 (1.16%)	0 (0%)	0 (0%)	0 (0%)	4 (1.16%)
	22 times	2 (0.58%)	1 (0.29%)	2 (0.58%)	1 (0.29%)	0 (0%)	0 (0%)	6 (1.74%)
	23 times	1 (0.29%)	0 (0%)	1 (0.29%)	0 (0%)	0 (0%)	0 (0%)	2 (0.58%)
	24 times	0 (0%)	1 (0.29%)	0	0 (0%)	1 (0.29%)	0 (0%)	2 (0.58%)
	25 times	0 (0%)	0 (0%)	1 (0.29%)	0 (0%)	0 (0%)	0 (0%)	1 (0.29%)
	27 times	1 (0.29%)	0 (0%)	0	0 (0%)	1 (0.29%)	0 (0%)	2 (0.58%)
	28 times	0 (0%)	1 (0.29%)	1 (0.29%)	0 (0%)	1 (0.29%)	0 (0%)	3 (0.87%)
	30 times	1 (0.29%)	0 (0%)	6 (1.74%)	0 (0%)	1 (0.29%)	0 (0%)	8 (2.32%)
	31 times	0 (0%)	0 (0%)	1 (0.29%)	0 (0%)	0 (0%)	0 (0%)	1 (0.29%)
	32 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.29%)	0 (0%)	1 (0.29%)
	34 times	0 (0%)	0 (0%)	0 (0%)	1 (0.29%)	0 (0%)	0 (0%)	1 (0.29%)
	35 times	1 (0.29%)	0 (0%)	1 (0.29%)	0 (0%)	1 (0.29%)	0 (0%)	3 (0.87%)
	39 times	0 (0%)	0 (0%)	1 (0.29%)	0 (0%)	0 (0%)	0 (0%)	1 (0.29%)
	42 times	0 (0%)	0 (0%)	1 (0.29%)	0 (0%)	0 (0%)	0 (0%)	1 (0.29%)
	48 times	0 (0%)	0 (0%)	1 (0.29%)	0 (0%)	0 (0%)	0 (0%)	1 (0.29%)
50 times	0 (0%)	0 (0%)	1 (0.29%)	1 (0.29%)	0 (0%)	0 (0%)	2 (0.58%)	
53 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.29%)	0 (0%)	1 (0.29%)	
55 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.29%)	0 (0%)	1 (0.29%)	
56 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.29%)	0 (0%)	1 (0.29%)	
61 times	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.29%)	0 (0%)	1 (0.29%)	
Total	62 (17.97%)	20 (5.80%)	161 (46.66%)	33 (9.57%)	55 (15.94%)	14 (4.06%)	345 (100%)	

**Supplementary Table 5.** Practicing physical distancing and using disinfectant after touching face mucosal zones among mask and non-mask wearers (N=700).

Variables	Frequency	Percentage (%)
Wearing a well-fitted mask (N = 163)		
Touching eyes	110	15.71%
Not touching eyes	53	7.57%
Wearing an ill-fitted mask		
Touching eyes	145	20.71%
Not touching eyes	63	9%
Without wearing a mask		
Touching eyes	228	32.58%
Not touching eyes	101	14.43%
Total	700	100%
Wearing a well-fitted mask (N = 163)		
Touching nose	101	14.43%
Not touching nose	62	8.86%
Wearing an ill-fitted mask (N = 208)		
Touching nose	159	22.71%
Not touching nose	49	7%
Without wearing a mask (N = 329)		
Touching nose	257	36.72%
Not touching nose	72	10.28%

Variables	Frequency	Percentage (%)
Total	700	100%
Wearing a well-fitted mask (N = 163)		
Touching mouth	76	10.86%
Not touching mouth	87	12.43%
Wearing an ill-fitted mask (N = 208)		
Touching mouth	137	19.57%
Not touching mouth	71	10.14%
Without wearing a mask (N = 329)		
Touching mouth	246	35.14%
Not touching mouth	83	11.86%
Total	700	100
Wearing a well-fitted mask (N = 163)		
Touching eyes with practice of physical distancing	24	3.43%
Touching eyes without practicing physical distancing	86	12.28%
Not touching eyes with practice of physical distancing	18	2.57%
Not touching eyes without practicing physical distancing	35	5%
Wearing an ill-fitted mask (N = 208)		
Touching eyes with practice of physical distancing	20	2.86
Touching eyes without practicing physical distancing	125	17.85
Not touching eyes with practice of physical distancing	19	2.71
Not touching eyes without practicing physical distancing	44	6.29
Without wearing a mask (N = 329)		
Touching eyes with practice of physical distancing	47	6.72
Touching eyes without practicing physical distancing	181	25.86%
Not touching eyes with practice of physical distancing	24	3.43%
Not touching eyes without practicing physical distancing	77	11%
Total	700	100%
Wearing a well-fitted mask (N = 163)		
Touching nose with practice of physical distancing	25	3.57%
Touching nose without practicing physical distancing	76	10.86
Not touching nose with practice of physical distancing	17	2.43%
Not touching nose without practicing physical distancing	45	6.43%
Wearing an ill-fitted mask (N = 208)		
Touching nose with practice of physical distancing	29	4.14%
Touching nose without practicing physical distancing	130	18.57
Not touching nose with practice of physical distancing	10	1.43%
Not touching nose without practicing physical distancing	39	5.57%
Without Wearing a mask (N = 329)		
Touching nose with practice of physical distancing	58	8.29
Touching nose without practicing physical distancing	199	28.43%
Not touching nose with practice of physical distancing	13	1.86
Not touching nose without practicing physical distancing	59	8.42
Total	700	100%
Wearing a well-fitted mask (N = 163)		
Touching mouth with practice of physical distancing	22	3.15
Touching mouth without practicing physical distancing	54	7.71
Not touching mouth with practice of physical distancing	20	2.86
Not touching mouth without practicing physical distancing	67	9.57%
Wearing an ill-fitted mask (N = 208)		
Touching mouth with practice of physical distancing	21	3%
Touching mouth without practicing physical distancing	116	16.57
Not touching mouth with practice of physical distancing	18	2.57%
Not touching mouth without practicing physical distancing	53	7.57
Without wearing a mask (N = 329)		
Touching mouth with practice of physical distancing	54	7.71
Touching mouth without practicing physical distancing	192	27.43
Not touching mouth with practice of physical distancing	17	2.43%
Not touching mouth without practicing physical distancing	66	9.43
Total	700	100%
Wearing a well-fitted mask (N = 163)		
Touching eyes with using a disinfectant at least once	49	7%
Touching eyes without using a disinfectant at least once	61	8.71%
Not touching eyes with using a disinfectant at least once	22	3.14%
Not touching eyes without using a disinfectant at least once	31	4.43%
Wearing an ill-fitted mask (N = 208)		
Touching eyes with using a disinfectant at least once	20	2.86%
Touching eyes without using a disinfectant at least once	125	17.86%
Not touching eyes with using a disinfectant at least once	9	1.29%
Not touching eyes without using a disinfectant at least once	54	7.71%
Without wearing a mask (N = 329)		
Touching eyes with using a disinfectant at least once	8	1.14%
Touching eyes without using a disinfectant at least once	220	31.43%
Not touching eyes with using a disinfectant at least once	9	1.29%
Not touching eyes without using a disinfectant at least once	92	13.14%
Total	700	100%
Wearing a well-fitted mask (N = 163)		
Touching nose with using a disinfectant at least once	43	6.14%
Touching nose without using a disinfectant at least once	58	8.29%
Not touching nose with using a disinfectant at least once	28	4%
Not touching nose without using a disinfectant at least once	34	4.86%
Wearing an ill-fitted mask (N = 208)		
Touching nose with using a disinfectant at least once	22	3.14%
Touching nose without using a disinfectant at least once	137	19.57%
Not touching nose with using a disinfectant at least once	7	1%
Not touching nose without using a disinfectant at least once	42	6%
Without wearing a mask (N = 329)		
Touching nose with using a disinfectant at least once	11	1.57%
Touching nose without using a disinfectant at least once	246	35.14%
Not touching nose with using a disinfectant at least once	6	0.86%
Not touching nose without using a disinfectant at least once	66	9.43%
Total	700	100%
Wearing a well-fitted mask (N = 163)		
Touching mouth with using a disinfectant at least once	32	4.57%
Touching mouth without using a disinfectant at least once	44	6.29%



Variables	Frequency	Percentage (%)
Not touching mouth with using a disinfectant at least once	39	5.57%
Not touching mouth without using a disinfectant at least once	48	6.86%
Wearing an ill-fitted mask (N = 208)		
Touching mouth with using a disinfectant at least once	22	3.14%
Touching mouth without using a disinfectant at least once	115	16.43%
Not touching mouth with using a disinfectant at least once	7	1%
Not touching mouth without using a disinfectant at least once	64	9.14%
Without wearing a mask (N = 329)		
Touching mouth with using a disinfectant at least once	12	1.71%
Touching mouth without using a disinfectant at least once	234	33.44%
Not touching mouth with using a disinfectant at least once	5	0.71%
Not touching mouth without using a disinfectant at least once	78	11.14%
Total	700	100%

**Supplementary Table 6.** Preventive measures followed by sellers while touching money (N = 700).

Variables	Frequency	Percentage (%)
Using a disinfectant at least once (N = 117)		
Wearing a well-fitted mask with practice of physical distancing, having no contact with people and no money touching	2	0.29%
Wearing a well-fitted mask with practice of physical distancing, having no contact with people and money touching	5	0.71%
Wearing a well-fitted mask with practice of physical distancing, having contact with people and no money touching	8	1.14%
Wearing a well-fitted mask with practice of physical distancing, having contact with people and money touching	8	1.14%
Wearing a well-fitted mask without practicing physical distancing, having no contact with people and no money touching	2	0.29%
Wearing a well-fitted mask without practicing physical distancing, having no contact with people and money touching	4	0.57%
Wearing a well-fitted mask without practicing physical distancing, having contact with people and no money touching	17	2.43%
Wearing a well-fitted mask without practicing physical distancing, having contact with people and touching surfaces	25	3.57%
Wearing an ill-fitted mask with practice of physical distancing and having no contact with people and no money touching	0	0%
Wearing an ill-fitted mask with practice of physical distancing and having no contact with people and money touching	0	0%
Wearing an ill-fitted mask with practice of physical distancing and having contact with people and no money touching	1	0.14%
Wearing an ill-fitted mask with practice of physical distancing and having contact with people and money touching	6	0.86%
Wearing an ill-fitted mask without practicing physical distancing and having no contact with people and no money touching	0	0%
Wearing an ill-fitted mask without practicing physical distancing and having no contact with people and money touching	1	0.14%
Wearing an ill-fitted mask without practicing physical distancing and having contact with people and no money touching	3	0.43%
Wearing an ill-fitted mask without practicing physical distancing and having contact with people and money touching	18	2.57%
Without Wearing a mask with practice of physical distancing and having no contact with people and no money touching	0	0%
Without Wearing a mask with practice of physical distancing and having no contact with people and money touching	1	0.14%
Without Wearing a mask with practice of physical distancing and having contact with people and no money touching	2	0.29%
Without Wearing a mask with practice of physical distancing and having contact with people and touching surfaces	3	0.43%
Without Wearing a mask and without practicing physical and having no contact with people and no money touching	1	0.14%
Without Wearing a mask and without practicing physical and having no contact with people and money touching	3	0.43%
Without Wearing a mask and without practicing physical and having contact with people and no money touching	3	0.43%
Without Wearing a mask and without practicing physical and having contact with people and money touching	4	0.57%
Not using a disinfectant (N = 583)		
Wearing a well-fitted mask with practice of physical distancing and having no contact with people and no money touching	3	0.43%
Wearing a well-fitted mask with practice of physical distancing and having no contact with people and money touching	4	0.57%
Wearing a well-fitted mask with practice of physical distancing and having contact with people and no money touching	6	0.86%
Wearing a well-fitted mask with practice of physical distancing and having contact with people and money touching	6	0.86%
Wearing a well-fitted mask without practicing physical distancing and having no contact with people and no money touching	6	0.86%
Wearing a well-fitted mask without practicing physical distancing and having no contact with people and touching money	9	1.29%
Wearing a well-fitted mask without practicing physical distancing and having contact with people and no money touching	17	2.43%
Wearing a well-fitted mask without practicing physical distancing and having contact with people and touching money	41	5.86%
Wearing an ill-fitted mask with practice of physical distancing and having no contact with people and no money touching	2	0.29%
Wearing an ill-fitted mask with practice of physical distancing and having no contact with people and touching money	5	0.71%
Wearing an ill-fitted mask with practice of physical distancing and having contact with people and no money touching	7	1%
Wearing an ill-fitted mask with practice of physical distancing and having contact with people and touching surfaces	18	2.57%
Wearing an ill-fitted mask without practicing physical distancing and having no contact with people and no money touching	2	0.29%
Wearing an ill-fitted mask without practicing physical distancing and having no contact with people and touching money	10	1.43%
Wearing an ill-fitted mask without practicing physical distancing and having contact with people and no money touching	24	3.43%
Wearing an ill-fitted mask without practicing physical distancing and having contact with people and money touching	111	15.85%
Without wearing a mask with practice of physical distancing and having no contact with people and no money touching	1	0.14%
Without wearing a mask with practice of physical distancing and having no contact with people and touching money	18	2.57%
Without wearing a mask with practice of physical distancing and having contact with people and no money touching	3	0.43%
Without wearing a mask with practice of physical distancing and having contact with people and touching money	43	6.14%
Without wearing a mask and without practicing physical distancing and having no contact with people and no money touching	4	0.57%
Without wearing a mask and without practicing physical distancing and having no contact with people and touching money	23	3.28%
Without wearing a mask and without practicing physical distancing and having contact with people and no money touching	49	7%
Without wearing a mask and without practicing physical distancing and having contact with people and touching money	171	24.43%
Total	700	100%