

## Knowledge, performance, and awareness towards the use of disinfectant and hand sanitizers during COVID-19 pandemic: A questionnaire-based survey

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### HOW TO CITE THIS

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**Abstract:** The COVID-19 pandemic has brought to the forefront the critical role of disinfectants and hand sanitizers in preventing the spread of infectious diseases. This study aimed to assess the knowledge, performance, and awareness of individuals regarding the use of these essential hygiene products during the COVID-19 pandemic in Libya, with a focus on the city of Zawia. A structured questionnaire comprising 41 items was utilized to gather data from 200 participants, covering demographics, knowledge about disinfectants and hand sanitizers, performance in utilizing these products, and awareness of their significance. The majority of respondents were female, reflecting a higher awareness and performance level compared to male participants. Social media emerged as a significant source of information, influencing participants' knowledge and practices. Despite a high level of education among participants, significant knowledge gaps were identified, highlighting the need for targeted educational initiatives. The study revealed a marked increase in the use of household disinfectants and hand sanitizers since the onset of the pandemic. However, it also identified high-risk practices, such as mixing chemical products and ingesting alcohol-based hand sanitizers. The findings underscore the importance of ongoing education and awareness campaigns to promote the safe and effective use of disinfectants and hand sanitizers in mitigating the transmission of COVID-19. Addressing these knowledge gaps and promoting proper hygiene practices is crucial for enhancing public health outcomes and reducing the risk of infection in Libya and beyond.

### Introduction

The onset of the COVID-19 pandemic has underscored the critical importance of stringent infection control protocols, particularly the employment of disinfectants and hand sanitizers to curb viral dissemination [1-4]. These preventative strategies have become increasingly pervasive across public health initiatives and personal hygienic regimens globally, Libya included. Nevertheless, their success hinges on the public's informed use, adherence, and cognizance of their correct application. Amid the pandemic landscape, deducing how individuals perceive and engage with disinfectant and hand sanitizer use is imperative [5, 6]. Such discernment not only furnishes guidelines for public health methodologies but is also instrumental in crafting personalized

habits and communal infection containment measures. Thereupon, a thorough evaluation of people's knowledge, practices, and awareness concerning these hygienic exercises is vital to pinpoint deficiencies and amplify the effectiveness of prevention modalities. Owing to various socio-cultural milieus and disparate levels of health literacy among communities, tailored studies are crucial to unearth detailed understandings about disinfectant and hand sanitizer utilization [7, 8]. Utilizing a structured questionnaire methodology enables researchers to procure information concerning a breadth of elements, encompassing respondents' grasp of suitable disinfection methods, regularity of hand cleansing routines, and informational sources shaping their actions, alongside prevailing challenges or false beliefs they may harbor [9].

In Libya, as elsewhere, such investigative pursuits possess considerable scholarly and utilitarian significance [10]. They yield insight into the impact of public health advisories and educational endeavours; pinpoint impediments to adhering to advocated hygienic norms; and inform prescriptive measures that target enhanced conformity with practices that reduce COVID-19 transmission risk [11]. Additionally, these studies aid in the expansion of general knowledge concerning contagion mitigation tactics and underpin subsequent pandemic preparation initiatives as well as the formulation of public health policies. Through meticulous scholarly investigation combined with empirical scrutiny, inquiries like the one delineated herein augment our comprehension of the intricate nexus between cognizance, behaviours, and community health results. By clarifying determinants impacting disinfectant and hand sanitizer usage during the ongoing COVID-19 episode in Libya, this inquiry seeks to foster targeted interventions that bolster superior hygienic observances aiding in the worldwide endeavour to restrain infectious maladies [12].

## Materials and methods

*Research design:* In this investigation, data was collected via a structured questionnaire to evaluate levels of knowledge, application, and awareness regarding disinfectants and sanitizers amid the COVID-19 pandemic [13]. The questionnaire aimed to gather insights into participants' comprehension, adherence to sanitization measures, and acknowledgment of the importance of these agents in curbing the spread of COVID-19 [14]. Following prior research, the survey was designed and disseminated digitally through various social media platforms. A preliminary phase of the study occurred from March to April 2022. Early findings suggest a predominance of respondents under the age of 35, with a notably small proportion being male. To address potential age-related sampling bias, additional respondents were recruited for manual surveying.

*Location of research:* The investigation took place in Zawia, a coastal city to the west of Libya, chosen for its varied demographic composition and logistical convenience for gathering information [15].

*Instrumentation:* The questionnaire was constructed upon existing literature and standards from health entities such as the World Health Organization (WHO) [16]. It included 41 queries across four sectors: demographic data, knowledge regarding sanitizers and disinfectants, their usage effectiveness, and cognizance of their significance [17].

*Participant selection:* Individuals encompassing various age groups, genders, and educational backgrounds comprised the sample. A stratified random sampling technique was employed to select 200 subjects who completed the questionnaire from March 2022 to June 2022 to capture a wide scope of viewpoints [18].

*Ethical considerations:* This study conformed to ethical norms which mandated confidentiality of data, informed consent from participants, and voluntary involvement in the research [19].

*Data procurement:* Data was acquired electronically via social networking sites which facilitated ease of access for respondents [20]. Before the main survey deployment, a preliminary survey was conducted over a

month-long period to evaluate its comprehensibility and rectify any ambiguities. The feedback obtained resulted in refinements that enhanced the survey's utility [21].

*Statistical analysis:* SPSS version 25 served as the analytical tool for collected data [22]. Descriptive statistical tools were applied to portray respondents' levels of knowledge, the effectiveness of product use, and awareness about sanitizers and disinfectants. The goal was to elucidate prevailing practices and pinpoint potential improvements in fostering appropriate hygiene habits during the pandemic [23].

## Results

*Participant demographic and sociodemographic information:* The research engaged 200 individuals, of which 121 completed the questionnaire via an online platform while 79 did so through paper-based methods. The gender distribution consisted of 76.5% female and 23.5% male participants.

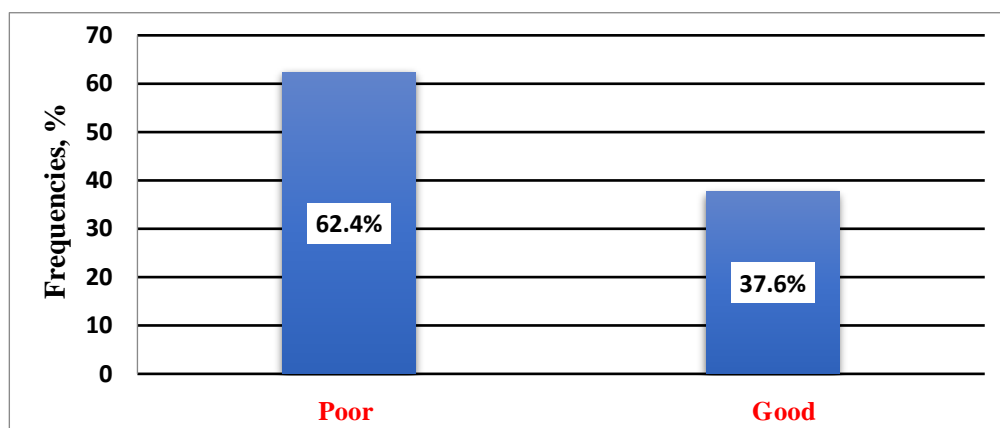
In exploring the sociodemographic data, a predominance was observed within the age bracket of 18 years to 35 years, encompassing 54.0% of subjects, with those aged 56 years and above representing 22.0%. Educational attainment was predominantly at the Bachelor's degree level (58.0%), and marital status was most frequently married (47.0%). Employment status indicated that 78.0% of respondents were actively employed.

**Table 1:** Sociodemographic information of the participants

	Item	Frequency	Parentage
<b>Gender</b>	Male	47	23.5%
	Female	153	76.5%
<b>Age (years)</b>	12 - 17	16	08.0%
	18 - 35	108	54.0%
	36 - 45	31	15.5%
	46 - 55	30	15.0%
	56 and above	15	07.5%
<b>Education Degree</b>	Unlearned	01	0.5%
	Primary Certificate	14	07.0%
	Secondary Certificate	25	12.5%
	Diploma	35	17.5%
	Bachelor	109	54.5%
	Master	08	04.0%
<b>Social Status</b>	PhD	08	04.0%
	Married	84	42.0%
<b>Occupational</b>	Unmarried	116	58.0%
	Employee	94	47.0%
	Free Lancer	02	01.0%
	Retired	04	02.0%
	Student	94	47.0%
	Unemployed	06	03.0%
<b>Are you medical Staff member?</b>	Yes	44	22.0%
	No	156	78.0%

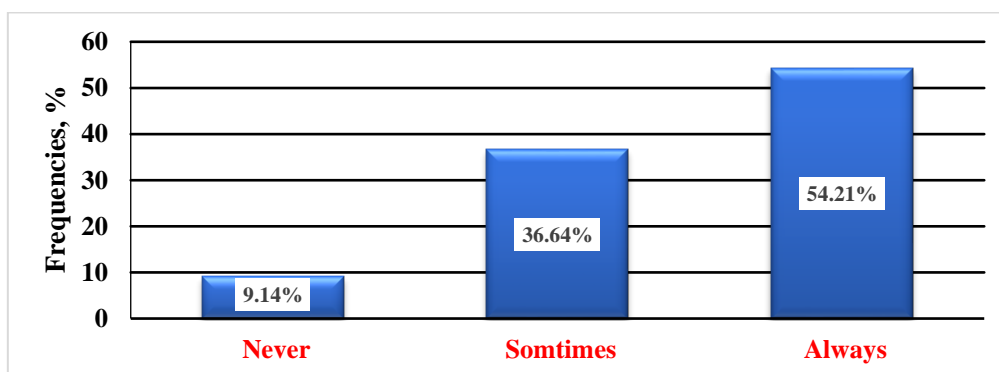
*Knowledge of disinfectants:* The survey revealed that a modest majority correctly identified ethanol as the active agent in hand sanitizers (55.0%), whereas, a close percentage recognized methanol as hazardous and lethal (45.0%). Merely a quarter were aware of the optimum alcohol concentration effective for hand sanitization (26.0%). Concerning surface disinfectants, about two-fifths (41.5%) accurately acknowledged alcohol as a disinfectant, and nearly one-third (31.5%) knew the appropriate chlorine concentration in bleach solutions (**Figure 1**).

**Figure 1:** Knowledge of participants about disinfectants



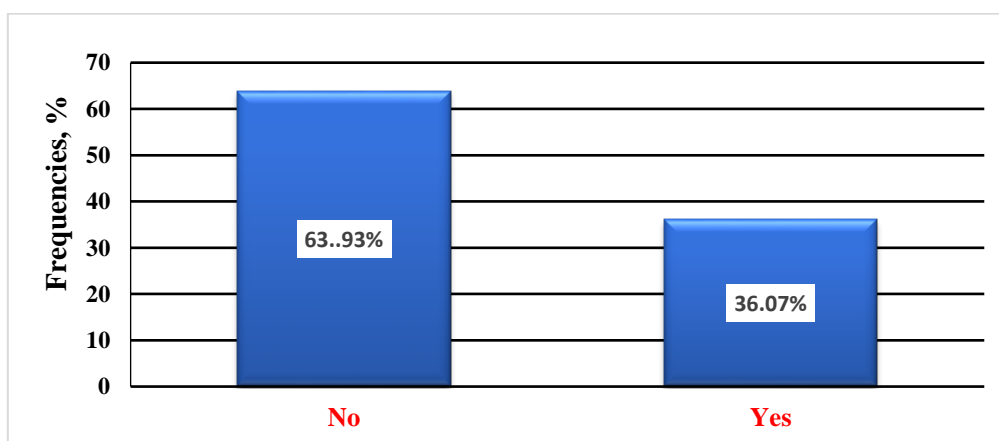
*Participants' conduct during the COVID-19 pandemic:* Data collected on behaviour during the COVID-19 pandemic showed that a significant majority consistently practiced hand hygiene upon returning home (89.0%) and maintained proper handwashing techniques (64.0%). Yet lower rates were reported for consistent disinfection practices involving personal items such as keys, cards, and mobile phones (54.0%), as well as commonly touched surfaces within their environment (43.5%) (**Figure 2a**).

**Figure 2a:** Participants' Performance during COVID-19



*Behaviour preceding the COVID-19 outbreak:* In comparison to pandemic behaviours, there was a decrease in reported handwashing frequencies upon arriving home before the COVID-19 outbreak (83.5%). Furthermore, regularly disinfecting personal belongings such as keys, cards, and mobile phones was notably less common (12.5%) (**Figure 2b**).

**Figure 2b:** Participants' performance before COVID-19



**Table 3:** Participants' performance

<b>During COVID-19</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Do you wash your hands when you get home?</b>		
Always	179	89.0%
Sometimes	20	10.0%
Never	01	00.5%
<b>Do you wash your hands carefully and correctly (at least for 20 seconds)?</b>		
Always	128	64.0%
Sometimes	65	32.5%
Never	07	03.5%
<b>Do you disinfect keys, cards, mobile phones, and equipment used outside when you get home?</b>		
Always	82	41.0%
Sometimes	101	50.5%
Never	17	08.5%
<b>Do you disinfect your hands or use gloves when buying items such as bread?</b>		
Always	108	54.0%
Sometimes	69	34.5%
Never	23	11.5%
<b>Do you disinfect surfaces that are frequently touched?</b>		
Always	11	59.5%
Sometimes	74	37.0%
Never	07	03.5%
<b>Do you disinfect purchased items containing packaging?</b>		
Always	87	43.5%
Sometimes	89	44.5%
Never	24	12.0%
<b>Do you use special disinfection solutions to disinfect fruit and vegetables?</b>		
Always	56	28.0%
Sometimes	95	47.0%
Never	49	24.5%

<b>Before COVID-19</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Did you wash your hands when you get home?</b>		
Yes	167	83.5%
No	33	16.5%
<b>Did you use to wash your hands carefully and correctly (at least for 20 seconds)?</b>		
Yes	77	38.5%
No	123	61.5%
<b>Did you use to disinfect keys, cards, mobile phones, and equipment used outside when you get home?</b>		
Yes	25	12.5%
No	175	87.5%
<b>Did you use to disinfect your hands or use gloves when buying items such as bread?</b>		
Yes	28	14.0%
No	172	86.0%
<b>Did you use it to disinfect surfaces that are frequently touched?</b>		
Yes	98	49.0%
No	102	51.0%
<b>Did you use it to disinfect purchased items containing packaging?</b>		
Yes	43	21.5%
No	157	78.5%
<b>Did you use to apply special disinfection solutions to disinfect fruit and vegetables?</b>		
Yes	67	33.5%
No	133	66.5%

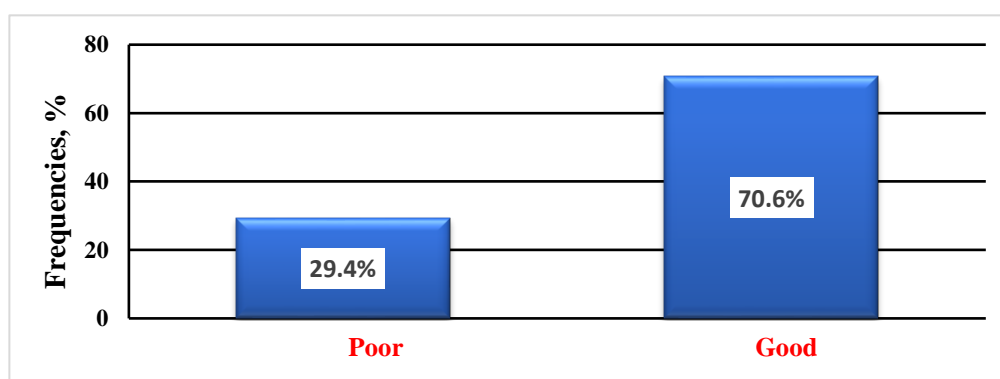
*Awareness related to disinfectant utilization:* Upon evaluating awareness levels about disinfectant use, it was noted that a substantial majority scrutinized labels on disinfectant packages before usage (82.0%) and consciously avoided ocular or facial contact while applying disinfectants on hands (91.0%). Nevertheless, only half of the respondents indicated they did not mix different cleaning agents and bleaches.

**Table 4:** Participants' awareness

Questions	Frequency	Percentage
<b>Do you read the label on the disinfectant packaging before use?</b>		
Yes	164	82.0%
No	36	18.0%
<b>Do you combine different cleaners and bleaches?</b>		
Yes	100	50.0%
No	100	50.0%
<b>Do you communicate with the pharmacist before you use any disinfectant or sanitizer for your hands or home for the first time you use it?</b>		
Yes	58	29.0%
No	142	71.0%
<b>Do you avoid contact with your eyes and face when disinfecting your hands?</b>		
Yes	182	91.0%
No	18	09.0%
<b>Do you ventilate the house when using disinfectants?</b>		
Yes	182	91.0%
No	18	09.0%
<b>Do you use protection tools when using disinfectants?</b>		
Yes	115	57.5%
No	85	42.5%
<b>Did you drink alcohol disinfectant with the intention of reducing your infection with the Coronavirus?</b>		
Yes	12	06.0%
No	188	94.0%

The findings gleaned from this study elucidate various dimensions of participants' knowledge base, everyday practices, and awareness before the utilization of disinfectants - pinpointing areas that necessitate enhanced instructional efforts and public health initiatives (**Figure 3**).

**Figure 3:** Participants' awareness



## Discussion

The objectives of this investigation were to evaluate the comprehension, consciousness, and practices of Zawia inhabitants about disinfectant and hand sanitizer usage during the COVID-19 crisis. The results offered profound insights into communal habits and perceptions concerning sanitary measures. Notably, a salient aspect was the predominant participation of female respondents [24], aligning with prior studies that point to

women demonstrating greater cognizance and application of health-centric routines [25]. This diverges from observations in different localities, such as Pakistan, where male attitudes toward infection control were more favourable [26]. The impact of social media was substantial for knowledge dissemination and heightened awareness, with a broad segment of individuals depending on these outlets for updates [27]. Nevertheless, even among the highly educated demographic, there was a notable lack of information regarding the correct disinfectant application [28]. This accentuates the need for correct information circulation through authoritative channels like government health portals and the execution of educational initiatives in communal arenas, academic institutions, and post-secondary campuses to refine public comprehension [29]. Furthermore, the investigation noted a significant surge in domestic disinfectant employment after the emergence of COVID-19 [30], signifying an escalation in hygiene mindfulness and safeguarding practices. This was further evidenced by enhancements in routines related to domestic sanitation and hand cleanliness in the post-pandemic era [31], potentially spurred by alarms broadcast via social media channels and apprehensions surrounding virus contagion. Despite of an overall satisfactory awareness quotient amongst study participants, alarming tendencies such as blending chemical substances [32] and ingesting alcohol-laden hand sanitizing solutions were documented [33], indicating potential dangers. These findings highlight the exigency for specialized educational endeavours to bridge knowledge lacunas and endorse the safe handling of disinfectants and sanitizers.

*Conclusion:* This research highlights the necessity for public education on safe sanitization practices in Zawia, Libya, amidst increased household disinfectant usage. It suggests possible demographic biases due to its sampling method and calls for future studies to investigate the adverse effects of disinfectant misuse. In reporting these findings, it is recommended that discussions are focused on broader implications without repetition, and conclusions are distinct and aligned with the study's objectives.

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**Author contribution:** FRA & KAA contributed to the study's conception. FAI, AMA & FAI contributed to data collection and analysis. FRA & FAI performed analysis and interpreted data. OMB drafted and revised the manuscript. All authors approved the final version of the manuscript and agreed to be accountable for its contents.

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**Ethical issues:** Including plagiarism, informed consent, data fabrication or falsification, and double publication or submission were completely observed by authors.

**Data availability statement:** The raw data that support the findings of this article are available from the corresponding author upon reasonable request.

**Author declarations:** The authors confirm that all relevant ethical guidelines have been followed and any necessary IRB and/or ethics committee approvals have been obtained.