

# Knowledge and Perception among of Health Care Workers Towards COVID-19, of Armed Forces Hospital - King AbdulAziz Air Base in Dhahran, Saudi Arabia

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## Abstract

The emergence of the novel coronavirus SARS-CoV-2 in December 2019 in Wuhan, China, represents a significant global public health threat. Initially named the Novel Coronavirus by the WHO, it was later categorised as SARS-CoV-2, sharing similarities with the 2003 SARS virus. Due to its high transmissibility, the resulting COVID-19 disease was declared an airborne, high-consequence infectious disease. By April 2020, COVID-19 had caused over 1 million confirmed cases and 50,000 deaths worldwide. This study evaluates healthcare workers' knowledge and perceptions of COVID-19 at AFH Dhahran, Saudi Arabia. Utilising a cross-sectional quantitative approach, a self-administered survey assessed socio-demographic data, sources of knowledge, and perceptions. Statistical analysis was performed using SPSS to identify trends and gaps. Findings indicated that while healthcare workers generally have adequate knowledge of COVID-19, significant gaps exist, particularly in understanding virus transmission and incubation. Misconceptions were also present among allied health workers. The study highlights the need for ongoing education, accurate information dissemination, and targeted interventions to effectively equip healthcare professionals with the tools to manage COVID-19. The results can inform public health strategies and education programs to improve patient outcomes and control the pandemic's spread. Addressing knowledge gaps and providing reliable information to healthcare workers is critical in mitigating the impact of COVID-19 and ensuring effective public health responses.

**Keywords:** COVID-19, Healthcare workers, Knowledge, Perception, Armed Forces Hospital, Infection Control, Personal protective equipment (PPE), Training, Risk awareness and Pandemic preparedness.

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## INTRODUCTION

In December 2019, the world witnessed the emergence of a novel coronavirus, initially identified in China, which led to severe respiratory illnesses, including pneumonia. Rapidly drawing global attention, this virus, initially referred to as the Novel Coronavirus, was later officially named SARS-CoV-2 by the World Health Organization (WHO). The illness associated with this virus was designated COVID-19. COVID-19 swiftly proved to be a highly contagious airborne disease, resulting in severe outcomes for those infected. The global impact of SARS-CoV-2 has since been immense, prompting the WHO to provide regular updates on the evolving situation. The emergence and rapid spread of COVID-19 presented unprecedented challenges to healthcare systems worldwide. Among the most affected

were healthcare workers (HCWs), including nurses, who faced massive pressures and significant risks while caring for patients. Despite strict safety measures aimed at protecting their physical health, the mental well-being of frontline HCWs has often been overlooked. These workers are particularly vulnerable to mental health issues such as anxiety, depression, burnout, and insomnia due to their direct exposure to the virus and the socio-environmental stresses associated with pandemic conditions.

Previous research has highlighted the importance of adequate personal protective equipment (PPE), strict safety protocols, and access to mental health resources in alleviating the psychological burden on HCWs. Flexible work schedules, rotation policies, and

temporary housing for those avoiding family contact have been recommended to support these frontline workers. However, there remains a gap in understanding the specific knowledge and perceptions of HCWs, especially within military healthcare settings such as the Armed Forces Hospital (AFH) in Dhahran, Saudi Arabia. The primary purpose of this study is to determine the knowledge and perceptions of healthcare workers towards COVID-19 at AFH Dhahran. Additionally, the research aims to identify any associations between demographic variables and the knowledge and perceptions of these HCWs. The scope of this study is to examine how socio-demographic factors such as age, gender, education level, and work experience influence the understanding and views of healthcare workers regarding the pandemic.

The novelty of this research lies in its focus on a military healthcare context within Saudi Arabia, providing unique insights that contribute to the global understanding of HCWs' experiences and perspectives during a pandemic. By addressing the knowledge gaps and identifying areas for improvement, this study aims to enhance the preparedness and proficiency of healthcare workers in managing COVID-19 cases, ultimately leading to better patient care and outcomes. In conclusion, this research sheds light on the critical knowledge and perceptions of healthcare workers at the Armed Forces Hospital in Dhahran amidst the ongoing COVID-19 pandemic. By understanding these factors, we can develop targeted educational programs and support systems that address the specific needs of HCWs, ensuring their wellbeing and sustained contributions in the face of extreme challenges.

## EXPERIMENTAL SECTION/MATERIAL AND METHODS

This section details the materials and methods used in the study to provide sufficient information for replication. The study employed a cross-sectional design to assess subjects at one point, offering insights into trends and associations within the research domains. Descriptive quantitative methods collected data through various statistical techniques such as frequencies and percentages. The research was conducted at the Armed Forces Hospital (AFH) in Dhahran, Saudi Arabia.

A convenience sample of healthcare workers employed at the Armed Forces Hospital in Dhahran since 2018 was chosen for this study. The total population was 400 staff members, including male and female participants. The Rao Soft sample size calculator was utilised, maintaining a 95% confidence level. The ideal sample size was determined considering a 5% margin of error, a 50% response distribution, and an estimated 10% attrition rate. The recommended sample size was 169 staff members, and an additional 30 staff members were included to account for attrition, resulting in a total target sample size of 199.

**Inclusion Criteria:** Healthcare workers (both male and female) are available in the hospital during the data collection period.

**Exclusion Criteria:** Healthcare workers (both male and female) are not present during the data collection period.

Ethical approval was obtained from the Research and Ethics Board at Armed Forces Hospital, Dhahran, Saudi Arabia IRB approval no. AFHER-IRB-2024-004. Informed consent was secured from department heads and participants, ensuring participants' right to withdraw at any time. Confidentiality and data privacy were strictly maintained, with anonymisation procedures to safeguard participants' identities.

Self-reported questionnaires were adapted from instruments originally developed by Md Saiful Islam in Bangladesh, with permission obtained via email. The questionnaires were modified to suit the local context and assessed knowledge and perceptions regarding COVID-19 among healthcare professionals at AFH Dhahran. The survey comprised sections designed to collect demographic data, assess knowledge, and evaluate perceptions using a Likert scale and multiple-choice questions. Section A: Demographic information including gender, age, nationality, education level, work experience, and profession. Section B: Questions assessing knowledge levels on a four-point Likert scale and multiple-choice questions to evaluate comprehension of COVID-19. Section C: Questions using a true-or-false format to gauge perceptions of COVID-19.

The questionnaires were distributed to participants via Google Forms. Prior permission from relevant department heads was obtained. Participants were briefed on the study's objectives and provided with informed consent, emphasising the voluntary nature of participation and confidentiality of responses. The estimated time for questionnaire completion was 15-20 minutes, and participants were instructed to seal their completed questionnaires to protect their privacy securely.

Researchers monitored the completion process on the same day to ensure accuracy and address participant queries. Participant confidentiality was preserved through anonymisation, assigning numerical codes instead of names, with only the lead researcher accessing the secure key linking codes to identities. Data was securely stored, with electronic data password-protected and physical data locked away with restricted access.

Data analysis was conducted using IBM SPSS Statistics V29. Descriptive statistical methods were applied to analyse demographic and research variables, including frequency, mean, standard deviation, and percentages. Results were displayed in tables, graphs,

and charts following APA guidelines. The aim was to identify correlations between socio-demographic data and the knowledge and perception of COVID-19 among healthcare workers at AFH Dhahran.

This study did not involve using chemicals, drugs, or animals. If applicable, any references to such will be detailed in the respective sections.

The pilot study evaluated the full-scale research project's feasibility, duration, costs, potential challenges, and overall improvement. Conducted with a sample of 217 healthcare workers from AFH Dhahran, the pilot utilised self-administered questionnaires and strict confidentiality protocols. The outcomes informed adjustments to the research methodology for the main study.

Content validity and reliability of the survey questionnaires were ensured through expert panel reviews, including the Institutional Review Board (IRB) and representatives from the research site. Reliability was assessed using a Chi-Square test p-value ( $P < 0.05$ ) determined during the pilot study.

## RESULTS AND DISCUSSION

This study aimed to investigate the knowledge and perceptions of healthcare workers (HCWs) towards COVID-19 at the Armed Forces Hospital Dhahran (AFH) in Dhahran, Saudi Arabia. The extensive survey included socio-demographic data and various sections designed to assess knowledge and perceptions regarding the virus. The objective was to identify keygaps and misconceptions that could be addressed through targeted educational interventions and policies. The data collection yielded a rich set of responses that provided significant insights.

### Demographic Distribution

The sample consisted predominantly of females (91%), with participants' ages ranging from 24 to over 61 years. The educational background varied from undergraduate degrees to doctoral qualifications, and many participants had more than four years of working experience at AFH. Professions represented included nurses (88%), physicians (4%), respiratory therapists (2.5%), and other specialities.

### Descriptive Statistic Socio-Demographic Variables

*Descriptive Statistic Socio-Demographic Variables Mean and SD. (N = 200)*

Variables	Categories	Frequency (N)	Percentage (%)	Mean	Std. Deviation
What is your Gender?	Male	18	9.0	1.9100	.28690
	Female	182	91.0		
What is your age? (years)	<24 Years	3	1.5	3.2050	.95789
	25 - 35 Years	48	24.0		
	35 - 44 Years	70	35.0		
	45 - 53 Years	65	32.5		
	55 - 60 Years	12	6.0		
	> 61 Years	2	1.0		
What is your nationality?	Saudi Arabia	33	16.5	4.0200	1.56905
	Malaysia	10	5.0		
	South Africa	8	4.0		
	India	25	12.5		
	Philippines	117	58.5		
	Others	7	3.5		
Educational level	Diploma	45	22.5	1.8700	.59571
	Bachelor	141	70.5		
	Master	9	4.5		
	Doctorate / PhD	5	2.5		
Working experience at AFH-KAAB? (years)	< 1 Year	8	4.0	2.8100	.48485
	2 - 3 Years	22	11.0		
	> 4 Years	170	85.0		
What is your Profession/Specialty	Physician	8	4.0	2.1550	.73051
	Nurse	176	88.0		
	Physiotherapy	2	1.0		
	Respiratory Therapy	5	2.5		
	Others	9	4.5		

*Note.* Explains that the analysis focuses on the variables "Gender", "Age", "Nationality",

"Working experience at AFH-KAAB", and "Profession/Specialty" and their distribution among the participants. The analysis provides information about the

frequency, percentage, mean, and standard deviation of the responses.

The analysis of the variable “Gender” shows that 18 participants (9%) identified as Male and 182 participants (91%) identified as Female, with a mean value of 1.9100, indicating a higher proportion of Female participants. The standard deviation, 0.28690, reflects minimal variation around the mean. For the variable “Age,” participants are grouped into categories such as “<24 Years,” “25 - 35 Years,” “35 - 44 Years,” “45 - 53 Years,” “55 - 60 Years,” and “> 61 Years.”

Major age distributions are 1.5% under 24 years, 24% between 25-35 years, 35% between 35-44 years, 32.5% between 45-53 years, 6% between 55-60 years, and 1% over 61 years. The mean age is 3.2050, with a standard deviation of 0.95789, indicating the spread of ages among participants. In terms of “Nationality,” participants are from various countries, with the largest group being from the Philippines (58.5%). Mean and standard deviation for nationality are 4.0200 and 1.56905 respectively, reflecting the variation in nationalities.

Regarding “Working experience at AFH-KAAB,” most participants (85%) have over four years of experience, with the mean experience being 2.8100 years and a standard deviation of 0.48485. The “Profession/Specialty” variable shows that 88% of participants are nurses. The mean for this variable is 2.1550, and the standard deviation is 0.73051, indicating diversity in professional backgrounds. These findings provide insights into the demographic and professional makeup of the participant group, which is essential for understanding potential patterns or influences in research specific to AFH-KAAB.

### Knowledge Levels

Knowledge assessment through Likert scale responses and multiple-choice questions revealed varying levels of understanding about COVID-19. Topics included transmission mechanisms, symptoms, preventive measures, and treatment options, with notable gaps in understanding incubation periods and symptoms.

### *Descriptive Statistic Variables Knowledge About the Novel Coronavirus (SAR-COV-19) Mean and Std. Deviation (SD)*

Descriptive Statistics	Mean	Std. Deviation
Have you heard about Novel Coronavirus	1.0700	.25579
Have you attended any of the lectures / discussions about Novel Coronavirus Diseases?	1.2200	.41529
How would you rank your source of information about the Wuhan Novel Coronavirus (SAR-COV-19) outbreak in China as a global emergency? - News, Media (TV, Radio, Newspapers etc....	2.9950	.86529
How would you rank your source of information about the Wuhan Novel Coronavirus (SAR-COV-19) outbreak in China as a global emergency? - Social media (Facebook, twitter, WhatsApp, YouTube, Instagram, Snapchat....	3.1100	.76867
How would you rank your source of information about the Wuhan Novel Coronavirus (SAR-COV-19) outbreak in China as a global emergency? - Official government website (MOH, WHO, CDC....	3.0000	.88539
How would you rank your source of information about the Wuhan Novel Coronavirus (SAR-COV-19) outbreak in China as a global emergency? - Family member, colleague, or friends...	2.8750	.86203
What is the incubation period of Novel coronavirus (SAR-COV-19)	2.3350	.89261
Symptoms of Novel Coronavirus (SAR-COV-19) are all except:	4.6100	1.00146
Novel Coronavirus (SAR-COV-19) origin is thought to be from?	2.4800	1.82380
Novel Coronavirus (SAR-COV-19) transmission occurs through?	2.5200	1.40695
What are the complications of Novel Coronavirus (SAR-COV-19)?	3.6650	.86980
What is the treatment of Novel Coronavirus (SAR-COV19)?	2.2850	.83502
How to reduce the risk of transmission?	4.3050	1.46379
<b>Valid N (listwise)</b>		

*Note.* These statistics provide insights into the participants' awareness and engagement with the topic, reflecting the diversity of knowledge and involvement within the surveyed population.

A Statistical Analysis, the comprehensive analysis of 200 participants' knowledge and awareness of Novel Coronavirus (SAR-COV-19) revealed significant insights into public understanding and information-seeking behaviours. The study demonstrated nearly universal awareness of COVID-19 (M=1.07, SD=0.26), though formal educational engagement remained notably low (M=1.22, SD=0.42). In terms of information sources, social media emerged as the predominant channel (M=3.11, SD=0.77), followed by official

websites (M=3.00, SD=0.89), traditional news media (M=2.99, SD=0.87), and interpersonal sources such as family and friends (M=2.88, SD=0.86).

The knowledge assessment revealed varying levels of understanding across different aspects of the virus. Participants demonstrated robust knowledge of symptoms (M=4.61, SD=1.00) and risk reduction measures (M=4.31, SD=1.46), along with a good grasp of potential complications (M=3.67, SD=0.87).

However, moderate understanding was observed regarding virus transmission ( $M=2.52$ ,  $SD=1.41$ ), origin ( $M=2.48$ ,  $SD=1.82$ ), incubation period ( $M=2.34$ ,  $SD=0.89$ ), and treatment options ( $M=2.29$ ,  $SD=0.84$ ). The higher standard deviations in some areas, particularly regarding virus origin and transmission, indicate considerable variation in participants' knowledge levels.

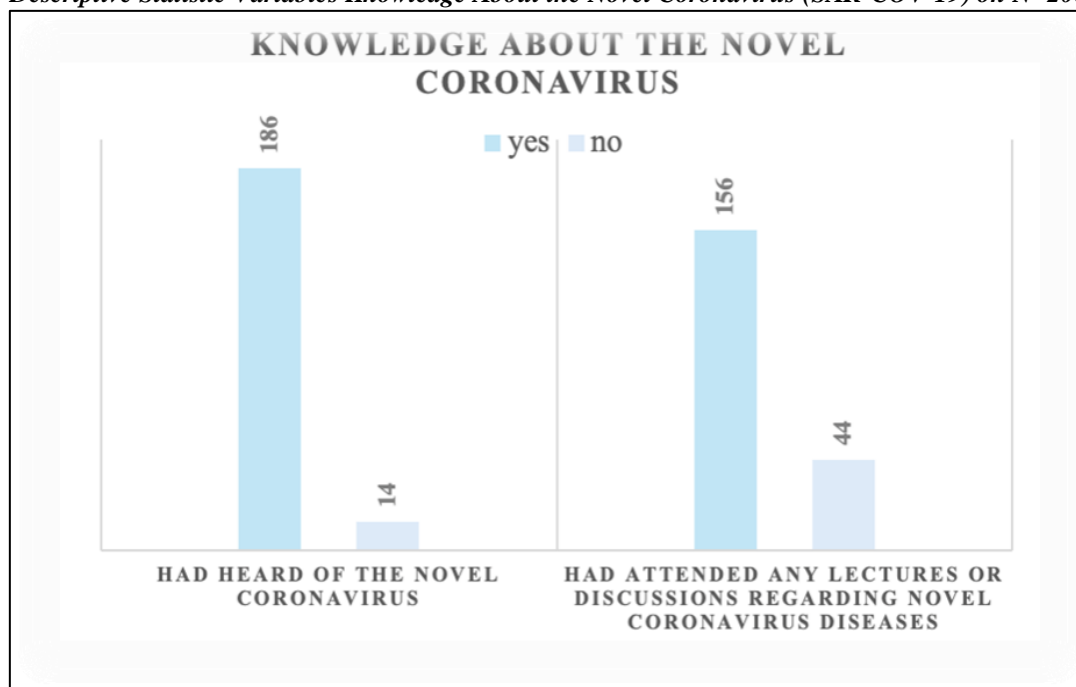
These findings suggest a clear pattern: while general awareness is high, there are significant gaps in detailed understanding of clinical and epidemiological aspects. The dominance of social media as an information source and limited participation in formal educational sessions point to the need for more structured educational interventions. The study recommends a multifaceted approach to address these knowledge gaps, including enhanced formal education opportunities, strategic use of social media for information dissemination, and targeted educational programs

focusing on areas with lower understanding. The relatively high standard deviations in certain areas also suggest the need for more consistent and standardised information delivery to reduce variations in public knowledge.

The results emphasise the importance of strengthening official communication channels while leveraging popular information sources, such as social media, to improve public understanding of COVID-19. This approach should focus on areas where knowledge gaps are most evident, such as treatment options and virus transmission mechanisms. The findings provide valuable insights for public health officials and educators in developing more effective communication strategies and educational programs to enhance public understanding of SAR-COV-19.

#### Frequency on Variables Knowledge (SAR-COV-19)

**Descriptive Statistic Variables Knowledge About the Novel Coronavirus (SAR-COV-19) on N=200**



Note, Frequency on Variables Knowledge About the Novel Coronavirus (SAR-COV-19) Section B1, Question number one to two N=200

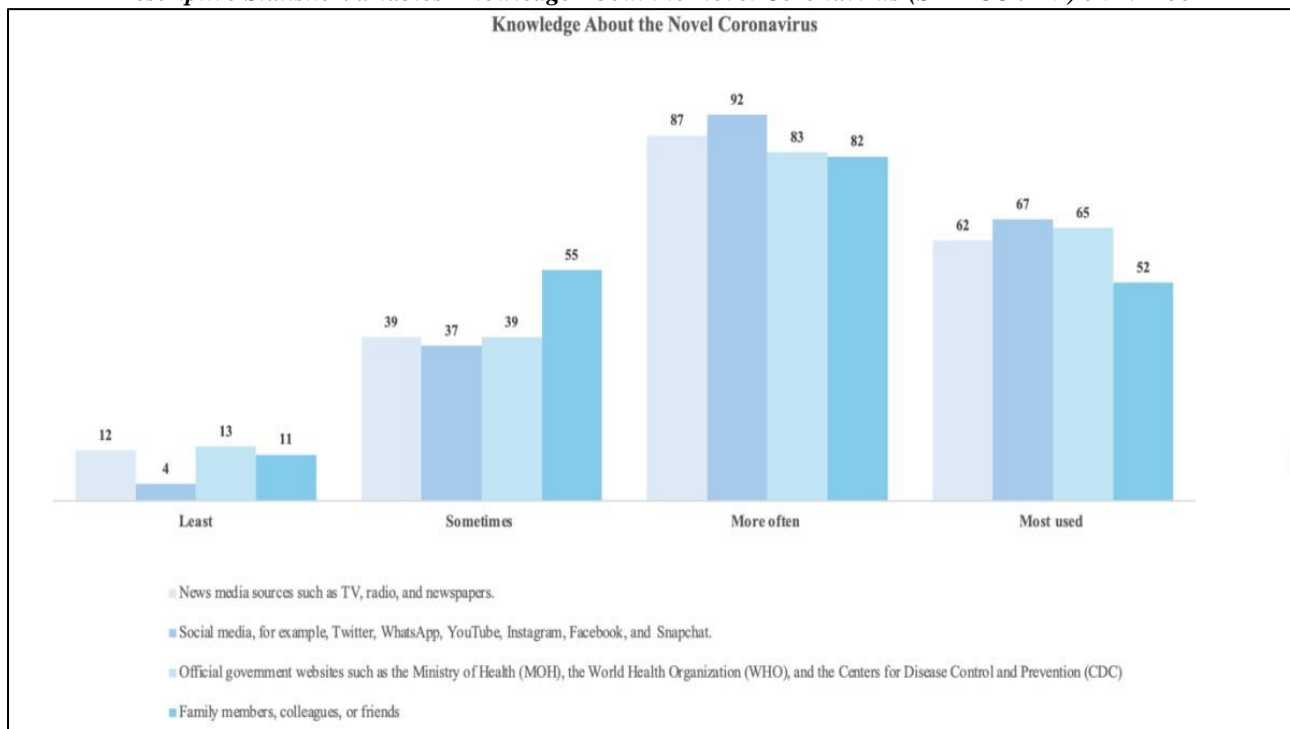
The analysis presents a comprehensive assessment of participants' awareness and engagement regarding the novel coronavirus (COVID-19), focusing on two fundamental aspects of knowledge acquisition. The findings reveal a notably high level of awareness among the study population, with 186 participants (93%) confirming their knowledge of the novel coronavirus, while only 14 participants (7%) indicated no prior awareness. This substantial awareness level suggests effective information dissemination within the community and demonstrates the widespread reach of COVID-19-related information.

Furthermore, the study examined participants' engagement with formal educational opportunities through their attendance at lectures and discussions about the novel coronavirus. The results show significant proactive engagement, with 156 participants (78%) having attended such educational sessions, while 44 participants (22%) had not participated in any formal discussions. This high attendance rate indicates a strong interest in acquiring detailed, structured information about the virus and suggests an actively engaged population seeking to enhance their understanding of COVID-19.

These findings establish a crucial baseline for understanding the participants' knowledge foundation and their approach to learning about the virus. The combination of high general awareness (93%) and strong participation in educational activities (78%) characterises the sample as well-informed and proactively engaged in COVID-19 education. This

context is precious for interpreting the study's broader implications and understanding participants' responses to other aspects of COVID-19 knowledge and behaviour. The results underscore the effectiveness of public health communication and educational initiatives while highlighting the population's commitment to staying informed about the pandemic.

#### *Descriptive Statistic Variables Knowledge About the Novel Coronavirus (SAR-COV-19) on N=200*



*Note, Frequency on Variables Knowledge About the Novel Coronavirus (SAR-COV-19) Section B2, Questions number one to four N=200*

The analysis focuses on the participants' responses to questions regarding using different sources of information related to the novel coronavirus (COVID-19). This analysis aims to understand the participants' preferred sources of information and their usage frequency. Question one explored the participants' usage of news media sources such as TV, radio, and newspapers. The analysis reveals that the least used category was news media, with only 12 participants indicating this as their least preferred source. However, most participants reported using news media sometimes 39 or more often 87 participants. The highest percentage of participants, 62, reported news media as their most used source. This analysis provides insights into the participants' reliance on traditional media for information about the novel coronavirus.

Question two examined the participants' social media usage, such as Twitter, WhatsApp, YouTube, Instagram, Facebook, and Snapchat. The analysis shows that social media was the least used source for a small percentage of participants, 4 participants. However, a significant proportion reported using social media, sometimes 37 participants or, more often, 92

participants. The highest percentage, 67 participants, reported social media as their most used source. This analysis highlights the popularity and influence of social media as a source of information about the novel coronavirus.

Question three of the survey asked participants about their usage of official government websites such as the Ministry of Health (MOH), the World Health Organization (WHO), and the Centres for Disease Control and Prevention (CDC). The analysis indicates that official government websites were the least used source for a small percentage of participants, 13 participants. However, a significant proportion reported using these websites, sometimes 39 participants or, more often, 83 participants. The highest percentage of participants, 65 participants, reported official government websites as their most used source. This analysis highlights the participants' reliance on authoritative sources for information.

Question four explored the participants' usage of information from family members, colleagues, or friends. The analysis shows that this source was the least

used for a small percentage of participants, 11 participants. However, a substantial proportion of the participants 55 participants reported that they sometimes rely on information from these personal connections 82 participants. Most participants, 52, reported family members, colleagues, or friends as their most used source.

This analysis indicates the importance of interpersonal communication in obtaining information about the novel coronavirus. These analyses provide insights into the participants' preferred information sources and usage frequency. By understanding their information seeking behaviour, the study can better assess the influence of these sources on the participants' knowledge, attitudes, and behaviours related to the novel coronavirus.

**Descriptive Statistic Variables Knowledge About the Novel Coronavirus (SAR-COV-19) on N=200**

Section B3	Question	Frequency, N = 200	Percentages (%)
B3Q1	<b>What is the incubation period of Novel Coronavirus? (SAR-COV-19)?</b>		
	2 – 7 days	32	16 %
	2 -14 days	90	45 %
	7 – 14 days	61	30.5 %
	7 – 21 days	13	6.5 %
	None as above	4	2 %
B3Q2	<b>Symptoms of novel coronavirus (SAR-COV-19) are all except</b>		
	Headache	7	3.5 %
	Fever	10	5 %
	Cough	4	2 %
	Sore throat and runny nose	12	6 %
	Skin rash	167	83.5 %
B3Q3	<b>Novel coronavirus origin is thought to be from</b>		
	Bats	116	58 %
	Snakes	6	3 %
	Camel	22	11 %
	Unknown	56	28 %
B3Q4	<b>I finish work late because of novel coronavirus transmission occur through</b>		
	Air	75	37.5 %
	Contact	37	18.5 %
	Feco-oral	3	1.5 %
	All the above	79	39.5 %
	None of the above	6	3 %
B3Q5	<b>What are the complications of novel coronavirus?</b>		
	Pneumonia	14	7 %
	Respiratory failure	11	5.5 %
	Death	3	1.5 %
	All the above	172	86 %
B3Q6	<b>What is the treatment of novel coronavirus?</b>		
	Supportive care	39	19.5 %
	Antiviral therapy	75	37.5 %
	Vaccination	76	38 %
	None of the above	10	5 %
B3Q7	<b>How to reduce the risk of transmission?</b>		
	Hand hygiene	26	13.5 %
	Covering the nose and mouth when coughing	10	5 %
	Having well-cooked meet and eggs	1	.5 %
	All the above	162	81 %

Note, Frequency on Variables Knowledge About the Novel Coronavirus (SAR-COV-19) Section B3, Questions number one to seven. (N / %)

In section B3 of the study, 200 participants were asked about their understanding of the incubation period of the Novel Coronavirus (SAR-COV-19). The results are that 16% of the participants believed the incubation period to be 2-7 days, while 45% believed it to be 2-14

days. Additionally, 30.5% of participants thought the incubation period was 7-14 days, and 6.5% believed it to be 7-21 days. Only 2% of participants indicated that none of the options matched their understanding. These findings suggest that there is some variation in

participants' knowledge regarding the incubation period of the Novel Coronavirus. Most participants believed it to be within the 2-14 days range. However, it is essential to note that these results are based on self-reported data and may differ from the broader population.

Question two participants were asked about the symptoms of the novel coronavirus (SARCOV-19). Out of 200 respondents, the findings are Headache: 3.5%, Fever: 5%, Cough: 2%, Sore throat and runny nose: 6% and skin rash: 83.5%. Most participants associated the novel coronavirus with a skin rash, while a smaller proportion associated it with other symptoms. Considering the limitations of self-reported data and the specific sample used in this study is essential.

Question three participants were asked about their beliefs regarding the origin of the novel coronavirus. Out of 200 respondents, the findings are Bats: 58%, snakes: 3%, Camel: 11% and Unknown: 28%. Most participants (58%) believed the novel coronavirus originated from bats, and a smaller proportion associated it with snakes (3%) or camels (11%). However, a significant portion (28%) indicated they were unsure about the virus's origin. It is important to note that these beliefs are based on participant perceptions and may not reflect the scientific consensus.

In question four, participants were asked about their beliefs regarding transmitting the novel coronavirus. Out of 200 respondents, the findings are Air: 37.5%, Contact: 18.5%, Feco-oral: 1.5%, All the above: 39.5% and None of the above: 3%. Most participants believed that the transmission of the virus occurs through multiple factors, including air, contact, and feco-oral routes. A smaller proportion associated it with air or contact only. However, it's important to note that these beliefs are based on participant perceptions and may not align with scientific consensus.

In question no five, participants were asked about their understanding of the complications associated with the novel coronavirus. Based on the responses of 200 participants, the findings are Pneumonia: 7%, Respiratory failure: 5.5%, Death: 1.5% and all the above: 86%. Most participants (86%) believed that all the mentioned complications - pneumonia, respiratory failure, and death - are associated with the novel coronavirus. However, it is essential to note that

these beliefs are based on participant perceptions and may not reflect the full range of potential complications or the actual prevalence of these complications.

In question six, participants were asked about their understanding of the treatment options for the novel coronavirus. Out of 200 respondents, the findings are that supportive care is 19.5%, antiviral therapy is 37.5%, vaccination is 38%, and none of the above is 5%. Most participants believed that antiviral therapy (37.5%) and vaccination (38%) were treatment options for the novel coronavirus. A smaller proportion associated it with supportive care (19.5%). However, 5% of participants indicated they needed to match their understanding of the treatment. It's important to note that these beliefs are based on participant perceptions and may not reflect the full range of treatment options or the current medical guidelines.

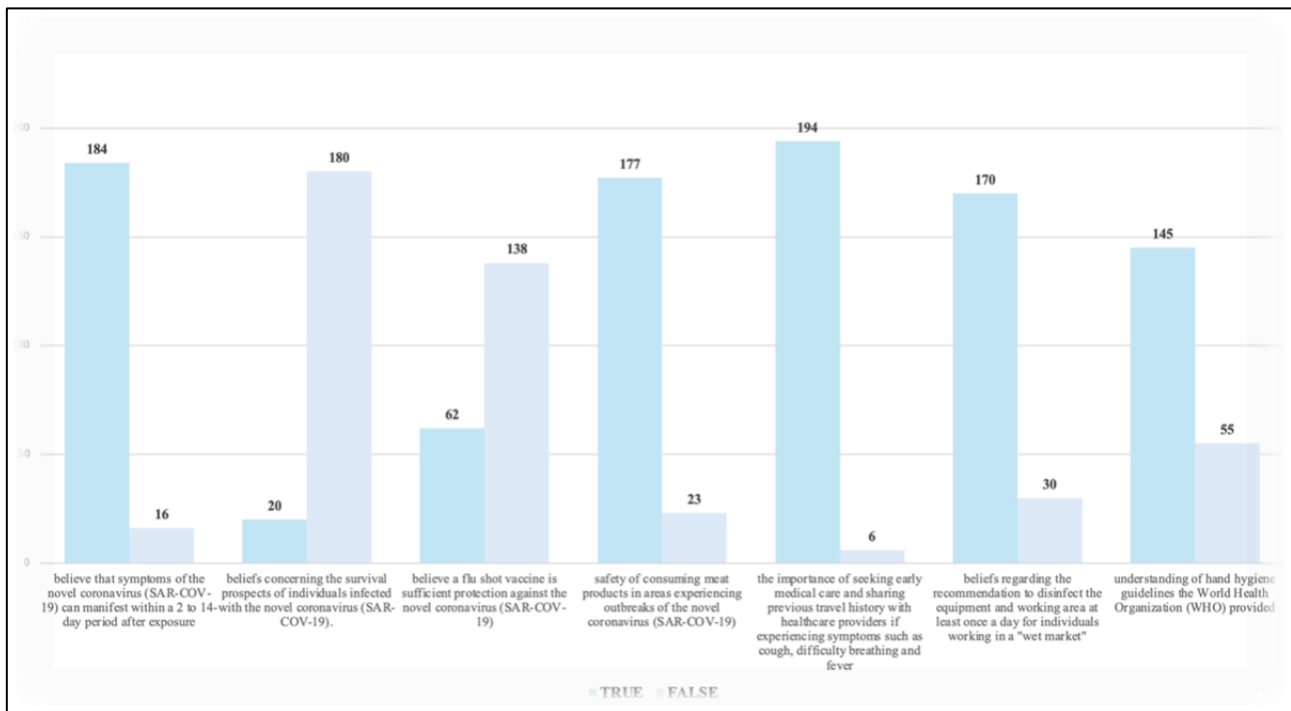
In question seven, participants were asked about their understanding of how to reduce the risk of transmission of the novel coronavirus. Based on the responses of 200 participants, the findings are that hand hygiene is 13.5%, covering the nose and mouth when coughing is 5%, and having well-cooked meat and eggs is 0.5%. Most participants (13.5%) believed hand hygiene is essential to reduce the risk of transmission. A smaller proportion associated it with covering the nose and mouth when coughing (5%). Only a tiny percentage (0.5%) believed that having well-cooked meat and eggs can help reduce transmission. However, it is crucial to note that these beliefs are based on participant perceptions and may not align with the comprehensive preventive measures recommended by health authorities. It is essential to promote accurate information and follow the policy provided by public health officials to reduce the risk of transmission effectively.

### Perceptions

The survey included true or false questions assessing various beliefs about COVID-19. The results indicated a general understanding of recommended medical and disinfection practices.

However, some misconceptions persisted, such as the belief in the efficacy of flu shots against COVID-19 and the safety of consuming meat products during outbreaks.



**Descriptive Statistic on Perceptions Variables**

Note, Frequency on Variables Perceptions About the Novel Coronavirus (SAR-COV-19) Section C, Questions number one to seven. (N = 200)

The comprehensive data analysis of the 200 respondents in the thesis concentrates on their responses to several true or false questions regarding their perceptions of various aspects of the novel coronavirus (COVID-19). This analysis evaluates the participants' comprehension of critical information about the virus and its prevention.

The analysis of question one explored the participants' knowledge about the onset of symptoms following exposure to the novel coronavirus. It was found that a significant majority of 184 individuals (92.0% of the sample) believed that symptoms could manifest within a 2 to 14-day period after exposure. Conversely, a minority of 16 respondents (8.0%) did not share this belief. Question two assessed the participants' beliefs concerning the survival prospects of individuals infected with the novel coronavirus. Among the respondents, 20 individuals (10.0%) believed that survival is not possible, while a majority of 180 respondents (90.0%) disagreed with this view.

Regarding question three, the participants were asked whether they believed a flu shot vaccine provided sufficient protection against the novel coronavirus; of the respondents, 62 individuals (31.0%) believed it was adequate, while 138 respondents (69.0%) disagreed. Most respondents (69.0%) correctly aligned with the current scientific understanding that a flu shot vaccine does not specifically protect against the novel coronavirus.

For question four, participants were queried on their beliefs about the safety of consuming meat products in areas experiencing outbreaks of the novel coronavirus. Of the total respondents, 177 individuals (88.5%) believed meat products can be safely consumed if cooked thoroughly and properly handled, while 23 respondents (11.5%) disagreed. Question five examined the importance of seeking early medical care and sharing travel history with healthcare providers if symptoms such as cough, difficulty breathing, and fever were experienced. Of the respondents, 194 (97.0%) believed it was essential, whereas 6 (3.0%) disagreed.

The analysis of question six addressed participants' beliefs about the recommendation to disinfect equipment and working areas at least once daily for individuals working in a "wet market." Out of the total respondents, 170 individuals (85.0%) agreed with this recommendation, while 30 respondents (15.0%) disagreed. Lastly, question seven explored participants' understanding of hand hygiene guidelines the World Health Organization (WHO) provided. The analysis revealed that a significant percentage of participants, 145 individuals (72.5%), incorrectly believed handwashing is only necessary when hands are visibly dirty. However, a substantial proportion, 55 participants (27.5%), correctly identified that hand hygiene should be practised regardless of visible dirt. This insight reflects the participants' understanding of hand hygiene guidelines. This detailed analysis provides critical insights into the participants' knowledge and beliefs regarding the novel coronavirus and its prevention methods.

**Descriptive Statistic Variables Perception About the Novel Coronavirus (SAR- COV-19) Mean and Std. Deviation (Sd)**

<b>Descriptive Statistics</b>	<b>Mean</b>	<b>Std. Deviation</b>
It is believed that symptoms of the novel coronavirus (SAR- COV-19) may appear in as few as 2 days or as long as 14 after exposure.	1.0800	.27197
If anyone is infected with the novel Coronavirus (SAR-COV- 19), there is no possibility of survival?	1.9000	.30075
If anyone has a flu shot vaccine against the novel coronavirus (SAR-COV-19), is it this sufficient?	1.6900	.46365
In areas experiencing outbreaks, meat products can be safely consumed if these items are cooked thoroughly and properly handled during food preparations?	1.1150	.31982
If anyone has a fever, cough and difficulty breathing seek medical care early and share previous travel history with the health care providers.	1.0300	.17102
If anyone works in a "wet market" it is recommended to disinfectant the equipment and working area at least once a day?	1.1500	.35797
As per WHO guidelines for the Novel coronavirus, you only need to wash hands when visibly dirty?	1.7250	.44763
<b>Valid N (listwise)</b>	<b>200</b>	

*Note.* Descriptive statistics summarise the data collected for each variable in a study. Let us analyse the descriptive statistics for each statement related to the novel coronavirus (SARCOV-19) regarding the minimum, maximum, mean, and standard deviation.

This statement suggests that the symptoms of the novel coronavirus can emerge within a range of 2 to 14 days after exposure. The mean value of 1.0800 indicates that, on average, symptoms tend to appear around 1 to 2 days after exposure, with a relatively low standard deviation of 0.27197. This statement refers to the survival possibility of individuals infected with the novel coronavirus. The mean value of 1.9000 implies that, on average, there is a high likelihood of survival. The standard deviation of 0.30075 indicates a moderate level of variation in responses. This statement addresses the effectiveness of a flu shot vaccine against the novel coronavirus. The mean value of 1.6900 suggests that, on average, people do not consider a flu shot vaccine sufficient. The standard deviation of 0.46365 indicates a relatively high level of variability in opinions among respondents.

This statement relates to the safety of consuming meat products during outbreaks. The mean value of 1.1150 suggests that, on average, people believe properly cooked and handled meat products can be safely consumed in outbreak areas. The standard deviation of 0.31982 indicates a moderate level of variation in responses.

Row no five: If anyone has a fever, cough, and difficulty breathing, seek medical care early and share previous travel history with healthcare providers. This statement emphasises the importance of seeking medical care in case of fever, cough, and difficulty breathing and sharing travel history with healthcare providers. The mean value of 1.0300 suggests that, on average, people acknowledge the necessity of early medical care. The standard deviation of 0.17102 indicates a relatively low level of response variability.

For row no six, if anyone works in a "wet market," it is recommended to disinfect the equipment and working area at least once a day. This statement advises individuals in a "wet market" to disinfect equipment and working areas daily. The mean value of 1.1500 indicates that, on average, people agree with the recommendation. The standard deviation of 0.35797 suggests a moderate level of variation in responses.

As per WHO guidelines for the Novel coronavirus, you only need to wash your hands when visibly dirty. This statement refers to the World Health Organization (WHO) guidelines regarding handwashing during the novel coronavirus outbreak. The mean value of 1.7250 indicates that, on average, people disagree with washing hands only when visibly dirty. The standard deviation of 0.44763 suggests a moderate level of variability in opinions among respondents. In summary, the descriptive statistics provide insights into the distribution and central tendencies of the responses to various statements related to the novel coronavirus. These statistics can help us understand the general perceptions and beliefs of the respondents regarding the virus and its associated factors.

### Statistical Analysis

Descriptive statistics highlighted the diversity in knowledge and perceptions among participants. Inferential statistics, specifically Chi-Square tests, identified significant associations between demographic factors (nationality, education level) and levels of knowledge and perceptions. Nationality and education level significantly influenced awareness and engagement with COVID-19-related information.

**Inferential Statistics (Chi-Square Test) Of Socio-Demographic Variables on Knowledge About the Novel Coronavirus (SAR COV-19)**

	<b>Inferential Statistics</b>	<b>N</b>	<b>Asymptotic Significance (2-sided)</b>
What is your nationality?	Have you heard about Novel Coronavirus?	200	.002
	Have you attended any of the lectures / discussions about Novel Coronavirus Diseases?	200	.002
	How would you rank your source of information about the Wuhan Novel Coronavirus (SAR-COV-19) outbreak in China as a global emergency? - News, Media (TV, Radio, Newspapers etc....	200	<.001
	How would you rank your source of information about the Wuhan Novel Coronavirus (SAR-COV-19) outbreak in China as a global emergency? - Social media (Facebook, twitter, WhatsApp, YouTube, Instagram, Snapchat....	200	.001
	How would you rank your source of information about the Wuhan Novel Coronavirus (SAR-COV-19) outbreak in China as a global emergency? - Official government website (MOH, WHO, CDC....	200	.008
	How would you rank your source of information about the Wuhan Novel Coronavirus (SAR-COV-19) outbreak in China as a global emergency? - Family member, colleague, or friends...	200	<.001
	What is the incubation period of Novel coronavirus (SAR-COV19)	200	<.001
	Symptoms of Novel Coronavirus (SAR-COV-19) are all except:	200	<.001
	Novel Coronavirus (SAR-COV-19) origin is thought to be from?	200	.155
	Novel Coronavirus (SAR-COV-19) transmission occurs through?	200	.053
	What are the complications of Novel Coronavirus (SAR-COV19)?	200	.066
	What is the treatment of Novel Coronavirus (SAR-COV-19)?	200	.010
	How to reduce the risk of transmission?	200	.106

*Note*, Chi-Square test between socio-demographics What is your nationality? on Knowledge about the Novel Coronavirus (SAR COV-19)

The analysis of the data provided, focusing on the significance levels for each survey question related to the P-value, is .002. The question shows a very strong statistical significance. This suggests that there is a notable relationship between the respondents' awareness of the novel coronavirus and their subsequent responses. Have you attended any of the lectures/discussions about Novel Coronavirus Diseases? The P-value is .002; this also shows strong statistical significance. This indicates a significant correlation in the data regarding lecture or discussion attendance.

On Source of Information about the Wuhan Novel Coronavirus as a Global Emergency - News, Media (TV, Radio, Newspapers) • P-value is <.001, This question has a very high statistical significance, implying that traditional media sources are critically related to perceptions of the outbreak as a global emergency. On the Source of Information social media (Facebook, Twitter, WhatsApp, YouTube, Instagram, Snapchat), the P-value is .001. There is significant statistical relevance indicating that social media also effectively informs respondents about the global emergency. On Source of Information, Official government website (MOH, WHO, CDC) P-value is .008, official government websites show a statistically significant relationship with how respondents perceive information about the outbreak. On Source of Information - Family member, colleague, or friends P-value is <.001, information from personal connections shows very high significance, indicating that

personal networks play a critical role in understanding the global emergency. What is the incubation period of the Novel Coronavirus (SAR-COV-19)? P-value is <.001. The survey responses about incubation periods are highly significant, indicating strong knowledge or perceptions regarding incubation. The symptoms of Novel Coronavirus (SAR-COV-19) are all except the P-value is <.001, This question also shows very high statistical significance, meaning respondents likely clearly understand coronavirus symptoms. On Novel Coronavirus (SAR-COV-19) origin is thought to be from? The P-value is .155; this question shows no significant relationship, suggesting that respondents' knowledge of the virus's origin is more varied or uncertain.

On Novel Coronavirus (SAR-COV-19) transmission occurs through? The P-value is .053; this question approaches significance but doesn't quite reach typical thresholds, indicating mixed levels of understanding about transmission routes. What are the complications of Novel Coronavirus (SAR-COV-19)? The P-value is .066; the responses here do not show significant statistical relevance, reflecting varied perceptions of complications. On What is the treatment for Novel Coronavirus (SAR-COV-19)? The P-value is .010; there is moderate statistical significance in responses, indicating some common understanding regarding available treatments. How to reduce the risk of transmission? The P-value is .106; This question does not

show significant statistical relevance, indicating varied or inconsistent knowledge of risk reduction measures. In summary, the data shows strong statistical significance for questions concerning awareness, attendance of discussions, traditional and social media sources,

personal connections, incubation periods, and symptoms. However, there is less significant relationship in responses concerning the origin, transmission, complications, and some aspects of the virus's treatment and risk reduction measures.

***Inferential Statistics (Chi-Square Test) Of Socio-Demographic Variables on Knowledge About the Novel Coronavirus (SAR COV-19)***

	<b>Inferential Statistics (2-sided)</b>	<b>N</b>	<b>Asymptotic Significance</b>
Education Level	Have you heard about Novel Coronavirus?	200	.011
	Have you attended any of the lectures / discussions about Novel Coronavirus Diseases?	200	.251
	How would you rank your source of information about the Wuhan Novel Coronavirus (SAR-COV-19) outbreak in China as a global emergency? - News, Media (TV, Radio, Newspapers etc....	200	.073
	How would you rank your source of information about the Wuhan Novel Coronavirus (SAR-COV-19) outbreak in China as a global emergency? - Social media (Facebook, twitter, WhatsApp, YouTube, Instagram, Snapchat....	200	.961
	How would you rank your source of information about the Wuhan Novel Coronavirus (SAR-COV-19) outbreak in China as a global emergency? - Family member, colleague, or friends...	200	.707
	How would you rank your source of information about the Wuhan Novel Coronavirus (SAR-COV-19) outbreak in China as a global emergency? - Family member, colleague, or friends...	200	.707
	What is the incubation period of Novel coronavirus (SAR-COV-19)	200	.924
	Symptoms of Novel Coronavirus (SAR-COV-19) are all except:	200	.070
	Novel Coronavirus (SAR-COV-19) origin is thought to be from?	200	.101
	Novel Coronavirus (SAR-COV-19) transmission occurs through?	200	.007
	What are the complications of Novel Coronavirus (SAR-COV-19)?	200	.814
	What is the treatment of Novel Coronavirus (SAR-COV-19)?	200	.001
	How to reduce the risk of transmission?	200	.037

Note, Chi-Square test between socio-demographic Education Level on Knowledge about the Novel Coronavirus (SAR COV-19)

This data represents inferential statistical analysis results from a questionnaire about the awareness and knowledge of individuals regarding the Novel Coronavirus (SAR-COV-19). Specifically, it looks at various questions related to the virus and evaluates the significance of the responses based on different education levels N=200.

Have you heard about Novel Coronavirus? P-value .011. There is a statistically significant association between education level and awareness of the Novel Coronavirus, as the p-value (.011) is less than the common significance level of 0.05.

Have you attended any of the lectures/discussions about Novel Coronavirus Diseases? P- value .251, There is no statistically significant association between education level and attendance at lectures about the Novel Coronavirus, as the p-value (.251) is more significant than 0.05.

Sources of information and their ranking as a global emergency on News, Media: .073, Social media: .961, Official government website: .603, Family member, colleague, or friends: .707. None of these

sources (news media, social media, official government websites, or personal networks) show a statistically significant relationship with education level, as all p-values are greater than 0.05.

Knowledge of specific information about the Novel Coronavirus: What is the incubation period? .924, Symptoms of Novel Coronavirus (SAR-COV-19) are all except .070, Origin of Novel Coronavirus: .101, Transmission of Novel Coronavirus: .007, Complications of Novel Coronavirus: .814, Treatment of Novel Coronavirus: .001, How to reduce the risk of transmission: .037. Significant associations (p-value < 0.05) are found concerning knowledge about the transmission (p-value .007), treatment (p-value .001), and how to reduce the risk of transmission (p-value .037) of the Novel Coronavirus. This suggests that education level significantly affects knowledge in these areas. Conversely, knowledge about the incubation period, symptoms, origin, and complications does not significantly correlate with education level (p-values > .05).

In summary, the data suggests that certain aspects of Novel Coronavirus awareness and knowledge

are significantly influenced by education level, particularly in general awareness, transmission, treatment, and prevention measures.

***Inferential Statistics (Chi-Square Test) Of Socio-Demographic Variables on Perception About the Novel Coronavirus (SAR COV-19)***

	<b>Inferential Statistics</b>	<b>N</b>	<b>Asymptotic Significance (2-sided)</b>
What is your Nationality?	It is believed that symptoms of the novel coronavirus (SARCOV-19) may appear in as few as 2 days or as long as 14 after exposure.	200	.165
	If anyone is infected with the novel Coronavirus (SAR-COV19), there is no possibility of survival?	200	.001
	If anyone has a flu shot vaccine against the novel coronavirus (SAR-COV-19), is it this sufficient?	200	.011
	In areas experiencing outbreaks, meat products can be safely consumed if these items are cooked thoroughly and properly handled during food preparations?	200	.049
	If anyone has a fever, cough and difficulty breathing seek medical care early and share previous travel history with the health care providers.	200	<.001
	If anyone works in a "wet market" it is recommended to disinfectant the equipment and working area at least once a day?	200	.020
	As per WHO guidelines for the Novel coronavirus, you only need to wash hands when visibly dirty?	200	.799

*Note, Chi-Square Test Between Socio-Demographics What Is Your Nationality? On Perception About the Novel Coronavirus (SAR-COV-19)*

The data above is related to a statistical analysis of responses to various statements about the novel coronavirus (SARS-CoV-2) N=200. This item seems to record respondents' nationalities. It is believed that symptoms of the novel coronavirus (SAR-COV-19) may appear in as few as 2 days or as long as 14 days after exposure with a p-value of .165. The p-value indicates that respondents' answers to this question did not significantly diverge from expected answers at the .05 significance level. If anyone is infected with the novel Coronavirus (SAR-COV-19), there is no possibility of survival? With a p-value of .001, there is a significant result, suggesting respondents' answers were significantly different from what might be expected by chance, perhaps indicating a common misconception that needs addressing. If anyone has a flu shot vaccine against the novel coronavirus (SAR-COV-19), is it this sufficient? The p-value of .011 suggests a statistically significant result, likely indicating confusion or misinformation about the efficacy of flu shots against COVID-19. In areas experiencing outbreaks, meat products can be safely consumed if these items are cooked thoroughly and properly handled during food preparations? With a p-value of .049, this is on the borderline of statistical significance, suggesting that while there may be some misconceptions, they are not strongly significant.

If Anyone has a fever, cough and difficulty breathing, seek medical care early and share previous travel history with the health care providers. The very small p-value (<.001) indicates a highly significant result, showing strong acknowledgement or understanding of this advice.

If anyone works in a "wet market," is it recommended that the equipment and working area be disinfected at least once a day? The p-value of .020 suggests a statistically significant result, perhaps reflecting awareness or practice regarding sanitary measures in wet markets. As per WHO guidelines for the Novel coronavirus, you only need to wash hands when visibly dirty? With a p-value of .799, this result is not statistically significant, suggesting respondents might be misinformed about hand hygiene guidelines or evenly split in their understanding.

Summary, respondents' understanding and misconceptions about COVID-19. Statements with p-values below .05 indicate significant misconceptions or awareness that depart from expectations. Statements with higher p-values suggest responses are not significantly different from what might be expected by chance, indicating neutrality or balanced understanding.

**Inferential Statistics (Chi-Square Test) Of Socio-Demographic Variables on Perception About the Novel Coronavirus (SAR COV-19)**

	<b>Inferential Statistics</b>	<b>N %</b>	<b>Asymptotic Significance (2-sided)</b>
Education Level	It is believed that symptoms of the novel coronavirus (SARCOV-19) may appear in as few as 2 days or as long as 14 after exposure.	200	.870
	If anyone is infected with the novel Coronavirus (SAR-COV19), there is no possibility of survival?	200	.689
	If anyone has a flu shot vaccine against the novel coronavirus (SAR-COV-19), is it this sufficient?	200	.186
	In areas experiencing outbreaks, meat products can be safely consumed if these items are cooked thoroughly and properly handled during food preparations?	200	.590
	If anyone has a fever, cough and difficulty breathing seek medical care early and share previous travel history with the health care providers.	200	.007
	If anyone works in a "wet market" it is recommended to disinfectant the equipment and working area at least once a day?	200	.738
	As per WHO guidelines for the Novel coronavirus, you only need to wash hands when visibly dirty?	200	.016

Table Chi-Square Test Between Socio-Demographic Education Level on Perception About the Novel Coronavirus (SAR-COV-19)

The Result Interpretation on Belief about the Appearance of Symptoms of SAR-COV-19 The high significance value .870 suggests that the belief that symptoms of the novel coronavirus might appear within 2 to 14 days after exposure does not show a significant deviation from a neutral stance. Essentially, most people believe this statement. Survival Possibility if Infected with Novel Coronavirus: A significance value of .689 indicates that the belief there is no possibility of survival if infected with the novel coronavirus is not statistically significant. This means the responses are closer to a neutral perspective, with no strong indication that people widely believe or disbelieve this statement. Effectiveness of Flu Shot Vaccine Against Novel Coronavirus, the lower significance value .186 suggests some disagreement or lack of belief in the effectiveness of a flu shot against the novel coronavirus. Safety of Consuming Meat Products in Outbreak Areas if Properly Cooked and Handled: A significance value of .590 indicates a moderate belief that consuming thoroughly cooked and adequately handled meat in outbreak areas is safe. There is no strong consensus, suggesting mixed opinions or varied awareness levels.

Recommendation to Seek Medical Care if Experiencing Fever, Cough, and Difficulty Breathing, Along with Sharing Travel History, the very low significance value of .007 shows a strong and statistically significant belief that one should seek medical care early and share travel history if experiencing symptoms like fever, cough, and difficulty breathing. Recommendation to Disinfect Equipment and Working Areas in Wet Markets at Least Once a Day: A high significance value of .738 suggests a general belief supporting the recommendation to disinfect equipment and working areas in wet markets at least once a day. WHO Guidelines on Handwashing Only When Hands are

Visibly Dirty, the low significance value (.016) indicates a significant opposition to the belief that one only needs to wash hands when visibly dirty. Speculations and Future Research Prospects, which Targeted Educational Interventions. Future efforts should concentrate on designing and implementing educational programs tailored to address the identified knowledge gaps and misconceptions, focusing on demographic variations.

Further Studies on Demographic Influences and additional research are needed to explore how specific demographic factors influence HCWs' knowledge and perceptions. This could help tailor more precise interventions. Conducting longitudinal studies to assess the effectiveness of educational interventions over time would provide valuable insights into the best practices for improving HCWs' preparedness and response capabilities. Integration of New Information Technologies, future research could explore the role of technology and social media in disseminating accurate information and countering misinformation among HCWs. Holistic approaches, which assess the integration of emotional well-being and support systems as part of educational programs, could enhance HCWs' overall resilience and job satisfaction. Assessment of Future Research or Prospects The study lays a foundation for future research on improving healthcare workers' knowledge and perceptions of pandemics. The findings suggest continuous education and training programs that evolve with the pandemic's developments and the importance of leveraging demographic insights to create effective and inclusive educational content. Exploring the impact of these interventions on HCWs' preparedness, mental health, and job performance should be prioritised. Healthcare organisations can effectively strengthen their workforce's ability to combat current

and future pandemics by addressing these areas through sustained research and intervention efforts.

## CONCLUSION

In conclusion, this thesis has critically examined the knowledge levels and perceptions of healthcare workers (HCWs) towards COVID-19 at AFH Dhahran, Saudi Arabia. The research has provided valuable insights into the current situation, highlighting strengths and improvement areas.

## Key Findings

There are significant knowledge gaps among HCWs regarding COVID-19, which must be addressed through targeted educational programs. Effective communication and collaboration are crucial for enhancing the understanding and management of COVID-19 among HCWs. The psychological impact of the pandemic on HCWs must be prioritised, with mental health support services being essential. Strengthened infection control measures are vital to protect HCWs and patients from COVID-19 transmission. Further research is needed to explore the long-term effects of COVID-19 on HCWs, focusing on aspects such as burnout, job satisfaction, and resilience.

## Outcome and Recommendations

By implementing the recommendations outlined in this thesis, enhanced educational programs, improved communication and collaboration, prioritisation of mental health support, and robust infection control measures, healthcare organisations and policymakers can better support HCWs in managing the pandemic. These initiatives will improve the quality of patient care and contribute to the overall resilience and well-being of the healthcare system at AFH Dhahran. Ultimately, this thesis aims to inform and guide future healthcare interventions, ensuring that HCWs are adequately prepared and supported in their vital roles during the pandemic and beyond.

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