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Batch 3

Causes of refusing of covid-19 vaccination among medical care providers in Omdurman teaching hospital 2022.

A thesis submitted to the program of Medicine and general surgery as a graduation project for MBBS degree.

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Abstract

Background: Coronavirus disease 2019 (COVID-19) is a pandemic and a current public health priority affecting the general population globally. Vaccination against COVID-19 has been available in Sudan since 2021. Despite the existence of the COVID-19 vaccine and the increasing vaccination rates among, there are reports of refusal to get vaccinated in a different segment of the population, including medical care providers. Data on the acceptance of vaccination and its influencing factors are necessary. Little is known about why medical care providers refuse the COVID-19 vaccination.

Objective: The aim of this study was to investigate the reasons leading to rejecting vaccination, among medical care providing in Omdurman teaching hospital.

Methods: A cross-sectional survey was conducted among a group of medical care providers at Omdurman teaching hospital. Data were collected from 307 participants through direct interview (100 participants were collected through an online Google submission form). Data were entered into SPSS program for analysis.

Results: Approximately 46.57 % of the medical care providers in the study had refused COVID-19 vaccination. Among age groups, 37.7% were less than 31years old, from 31-40 years old were 5.5% and 3.2% more than 40 years old. Refusal among doctors was 19.86%, , 20.5% of nurses were refused, 3.58%, refusal among laboratory technicians, among Anasethia technicians 0.65% were refused to get vaccine, 1.95% pharmacists refused.

Three main categories of reasons for refusing a COVID-19 vaccination were identified: it's a new vaccine and there is no enough data, they don't believe in vaccine, and it has many complications.

Conclusions: Approximately near half of the medical care providers in Omdurman teaching hospital participated in this study were indicated to refuse COVID-19 vaccination. The development of effective vaccine will be an important landmark for vaccine hesitancy and refusal among medical care providers.

الملخص:

المقدمة : يعتبر مرض كورونا احد اهم امراض الجهاز التنفسي ويُعرَف الفيروس باسم فيروس المتلازمة التنفسية الحادة الوخيمة كورونا 2 (سارس-كوف-2). ويُسمَّى المرض الناتج عنه مرض فيروس كورونا المستجد 2019 (كوفيد 19). في مارس 2020، أعلنت منظمة الصحة العالمية أن فيروس كورونا (كوفيد 19) قد أصبح جائحة عالمية. طورت العديد من شركات الادويه لقاحات مختلفه ضد مرض Covid 19.ان لقاحات كوفيد-19 **هي** لقاحات آمنة وفعّالة وتوفر حماية قوية **من** المرض الشديد والوفاة. وابالرغم من ذلك فقد دلت اغلب الدراسات على ان اعداد كبيره من سكان العالم قد رفضو تلقيهم لتطعيم الكورونا .وقد دلت اغلب المسوحات على ان اغلب الرافضين للقاح هم العاملين في الحقل الطبي ,سواء اطباء,ممرضين,فني مختبرات ,فني تخدير ,بالاضافه الي الصيادله ,وبما ان هؤلاء يعتبرو هم خطوط الدفاع الاولي في مواجهة المرض فكان من الامثل محاوله معرفة الاسباب الكامنه وراء رفض اللقاح من قبل العاملين بالحقل الطبي.

طرق البحث:حوالي 307 استبيان من العاملين في مستشفى ام درمان التعليمي شملهم هذا البحث.

النتائج :اظهر البحث ان هناك 46.57% رفضو اخذ التطعيم ضمن مجمعه الدراسه ,37.7% كانو تحت سن 31 سنه ,5.5% كانت اعمارهم تتراوح بين 31-40 سنه , 3.2% كانو فوق الاربعين .

19.86%, كانو من الاطباء ,20.5% من طاقم التمريض ,,3.58% من فني المعامل ,0.65% فني التخدير ,و 1.95% من الصيادله.

الخلاصه:ما يقارب نصف المشاركين في الدراسه والعاملين بمستشفى ام درمان التعليمي قد رفضو اخذ اللقاح مع اختلاف الاسباب .ان تطوير لقاح امن وفعال تطبق فيه كل المعايير الدوليه لانتاج اللقات قد يوثر في قرارات العاملين بالمجال الصحي تجاه اخذ اللقاح.

ACKNOWLEDGMENT

All thanks to ALLAH for his mercy, and beneficeny. Without his help, nothing can be accomplished.

We extend our thanks and appreciation to our supervisor **Dr. Hadeel Ahmed Alhassan**, Department of community medicine, Program of medicine, Napata College, for her support, keen guidance, and position during the period of this study.

Deep thank for all medical care providers enrolled in this study.

DEDICATION

We dedicate this project to our families

TO all medical care providers in my lovely country Sudan, who work under harsh conditions.

To all medical care providers who died defending their rights.

To the martyrs of the revolution from the medical field.

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Chapter One

3. Introduction

Coronavirus disease (COVID-19) is an infectious disease brought on by the SARSCoV-2 virus. This virus belongs to a broad family of viruses that are known to cause illnesses ranging from the common cold to more serious conditions like Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS).A novel, or new, coronavirus is called nCoV (COVID-19). Several coronaviruses are circulating in animals that have not yet infected people, including SARS-CoV, which was spread from civet cats to humans in China in 2002, and MERS-CoV, which was spread from camels to humans in Saudi Arabia in 2012 (1).Most people infected with the virus experienced mild to moderate respiratory illness and sometimes recover without requiring any treatment, but in some cases disease will be seriously and people will require medical attention (2).

3.2. Covid-19 vaccine

In late 2020 and early 2021, many nations allowed the use of COVID-19 vaccines in the general populace.There are currently more COVID-19 vaccine candidates in development than there have ever been for an infectious illness. All of them are attempting to develop virus immunity, and some of them may also be able to prevent transmission. By triggering an immune response to an antigen, a chemical present on the virus, they achieve this.The antigen in the instance of COVID-19 is commonly the unique spike protein that can be seen on the virus's surface and that it typically uses to help it infiltrate human cells (3). A number of COVID-19 vaccines are currently available for production and sale. Several companies received emergency licenses from various health organizations during the month of December 2020, including Moderna in the United States, Pfizer-Biotech in the United States and Europe, Oxford-AstraZeneca in the United Kingdom, and Sinopharm in China (4), to effectively suppress the COVID-19 pandemic, it will be essential for effective SARS-CoV-2

vaccinations must be broadly used. Medical care providers (MCP) were selected as priority groups for vaccination in the majority of countries as COVID-19 vaccines were released in late 2020 and early 2021 (5).

3.3. Covid-19 vaccination refusal among medical care providers

Local medical care providers (MCP) are among the most respected and important experts in the world when it comes to helping people and families make decisions about vaccinations (6).Medical professionals play important roles in their communities outside of their professional responsibilities. Medical professionals around the world frequently have vaccine hesitation (7). The general public's refusal rates to receive the COVID-19 vaccine have now been studied globally, raised significant international concerns, and are largely well-established (8). There was a great deal of anticipation awaiting these vaccines, and for MCP, they were a source of hope, a means of fighting the pandemic and continuing to help others while safeguarding themselves (9). Recent reports have also highlighted MCP's refusal to receive the COVID-19 vaccine.Little is known about the scope and predictors of COVID-19 vaccination rejection among healthcare professionals, despite media stories and scientific publications.The complexity of this issue may make it difficult to analyze how vaccine refusal, including readiness to receive COVID-19 vaccinations, affects the world as a whole (10).

3.4. Problem statement

The WHO advises that frontline healthcare professionals (to safeguard healthcare systems) and those who are most at risk of dying from COVID-19, such as the elderly and those with certain medical conditions, be identified as priority populations in each nation. As more vaccine doses become available, other groups should be given priority after other crucial

employees like teachers and social workers. Despite the fact that the COVID-19 vaccination has been accessible in Germany since December 2020, research have shown that approximately 30% of the public says they do not intend to get the vaccine (11). The global prevalence rate of COVID-19 vaccine refusal among 41,098 nurses from 36 countries was 20.7% (12). In Ethiopia, about 38.5% of the medical professionals have declined the COVID-19 vaccination (4). Many medical professionals, however, have doubts about receiving the Covid-19 vaccination and have chosen not to do so for a number of reasons with various backgrounds, including cultural, religious, psychological, loss of loved ones due to the Covid-19 vaccine, and suspicion of the vaccine's effectiveness. The purpose of this study is to determine and analyze these factors among medical care providers working in Omdurman teaching hospital in Khartoum city, Sudan.

3.5. Justification

The first line of defense against the covid-19 pandemic and those most at risk of catching the virus are medical professionals.They must be well-cared from any form of infection or illness because of their critical and effective involvement in treating for the others.Therefore, the first issue to be concerned about that should be their safety.It was particularly odd that some healthcare professionals were not interested in receiving the Covid-19 vaccine when it initially became introduced. Moreover, there was also an extremely high frequency of death among healthcare professionals globally.The Covid-19 vaccination was one approach for sustaining immunity against the virus, and yet many MCP rejected to receive it for a number of reasons.Insights from the perspective of healthcare professionals in Omdurman teaching hospital in Khartoum city were utilized in the study to identify the causes behind COVID-19 vaccine refusal.

3.6. Objectives

3.7. 1.6.1. General Objectives

To determine the causes of refusing of covid-19 vaccination among medical care providers in Omdurman teaching hospital, 2022.

1.6.2. Specific objectives:

To determine the covid-19 vaccine refusal rates among medical providers.

To identify the contributing variables and reasons for vaccine refusal

To assess the knowledge about vaccines and its types among medical providers.

Chapter Two

4. Literature review

Coronavirus disease (COVID-19) is caused by SARS-COV2 and represents the causative agent of a potentially fatal disease that is of great global public health concern. Coronaviruses are a big family of different viruses. Some of them cause the common cold in people. Others infect animals, including bats, camels, and cattle.

Coronaviruses derive their name from the Latin word “corona” meaning crown. The name refers to the unique appearance of the virus under an electron microscope as round particles with a rim of projections resembling the solar corona. They are enveloped, positive-sense, single-stranded RNA viruses which were first isolated from humans in 1965. Coronavirus belongs to the family Coronaviridae which is known to produce mild respiratory diseases in humans. In recent times, there have been three major coronaviruses leading to disease outbreaks, beginning with the severe acute respiratory syndrome coronavirus (SARS–CoV) in 2002, followed by the Middle East respiratory syndrome coronavirus (MERS–CoV) in 2012, and now the severe acute respiratory syndrome coronavirus 2 (SARS–CoV2) (13).

2.1. Types of coronaviruses

Scientists first identified a human coronavirus in 1965. It caused a common cold. Later that decade, researchers found a group of similar human and animal viruses and named them after their crown-like appearance. Seven coronaviruses can infect humans. The one that causes SARS emerged in southern China in 2002 and quickly spread to 28 other countries. More than 8,000 people were infected by July 2003, and 774 died. A small outbreak in 2004 involved only four more cases. The coronaviruses behind Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS) developed from bats. This coronavirus causes fever, headache, and respiratory problems such as cough and shortness of breath.MERS

started in Saudi Arabia in 2012. Almost all of the nearly 2,500 cases have been in people who live in or travel to the Middle East. This coronavirus is less contagious than its SARS cousin but more deadly, killing 858 people. It has the same respiratory symptoms but can also cause kidney failure. Affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization (12).

2.1.1. Origin of covid-19

The virus was first detected in Wuhan, China, in late 2019 and has set off a global pandemic. There have been numerous investigations to determine the origins of SARS-CoV-2 but none has been conclusive. The virus first appeared on a small scale in November 2019 with the first large cluster appearing in Wuhan, China in December 2019. It was first thought SARS-CoV-2 made the jump to humans at one of Wuhan, China's open-air "wet markets." Later theories voiced concern that it may have originated as a biological weapon in a lab in China. As SARS-CoV-2 spread both inside and outside China, it infected people who have had no direct contact with animals (2). That meant the virus is transmitted from one human to another. It's now spreading around the globe. The worldwide transmission is what a pandemic is now. Currently, there are two hypotheses as to its origins: Exposure to an infected animal or man-made in a laboratory. There is not enough evidence to support this argument. The latest intelligence reports agree that the virus is not genetically engineered or developed as a biological weapon. They do say it is possible the version of a coronavirus was being studied with animals in a lab and exposure occurred there. Again, however, there is not enough evidence for a definitive conclusion (2).

2.1.1.1. Most common symptoms

Fever, cough, tiredness, loss of taste or smell. Less common symptoms: sore throat, headache, aches and pains, diarrhea, a rash on skin, or discoloration of fingers or toes red or irritated eyes.

2.1.1.2. Serious symptoms

Difficulty breathing or shortness of breath. Loss of speech or mobility, or confusion, chest pain. On average it takes 5–6 days from when someone is infected with the virus for symptoms to show, however it can take up to 14 days. About 25 observational studies with moderate to high methodological quality, considering 5440 participants. The frequency of long COVID-19 ranged from 4.7% to 80%, and the most prevalent signs/ symptoms were chest pain (up to 89%), fatigue (up to 65%), dyspnea (up to 61%), cough and sputum (14).

2.1.2. Types of covid-19 vaccine

The global efforts to lessen the effects of the pandemic, and to reduce its health and socio-economic impact, rely to a large extent on the preventive efforts. Thus, huge efforts by the scientific community and pharmaceutical industry backed by governments' support, were directed towards developing efficacious and safe vaccines for SARS-CoV-2. These efforts were manifested by the approval of several vaccines for emergency use, in addition to more than 60 vaccine candidates in clinical trials. Moreover, more than 170 COVID-19 vaccine candidates are in the pre-clinical phase. In addition to preventive measures such as social distancing, mandatory face coverings in public settings and intensified hygiene measures, vaccination considerably reduces the risk of contracting COVID-19 (13).The COVID-19 vaccines are highly effective, but no vaccine provides 100 per cent protection. Some people will still get ill from COVID-19 after vaccination or pass the virus onto someone

else. Vaccines save millions of lives each year Scientists around the world are working faster than ever to develop and produce vaccines that can stop the spread of COVID-19 (2).There are four categories of vaccines in clinical trials: whole virus: Whole virus vaccines use a weakened or deactivated version of the disease-causing virus to trigger protective immunity against it. Protein subunit: two-dose vaccine which is a combination of spike proteins and an adjuvant. Viral vector and nucleic acid (RNA and DNA) two doses. Some of them try to smuggle the antigen into the body, others use the body's own cells to make the viral antigen (2).

4.2. Reasons behind the refusing of vaccine among health providers

COVID-19 vaccines were approved for use in the general population in late 2020 and early 2021 across different countries. COVID-19 vaccination hesitancy rates in the general population have now been explored across the world and are fairly well established (15). For example, in a recent systematic review which was conducted by Sallam and his co-workers reported, that the highest rates for COVID-19 vaccine acceptance in the general population were reported in Ecuador, Malaysia, Indonesia, and China (> 90% for all countries). In contrast, the lowest rates were reported for Kuwait, Jordan, Italy, Russia, Poland, United States, and France (< 60% for all countries) (10). In some studies done by Misir, it is from the general population, it has been shown that COVID-19 vaccination hesitancy rates differ worldwide by perceived susceptibility to and severity of COVID-19 and several sociodemographic characteristics such as sex, age, education, income, and occupation (1). Interesting study was done by Khubchandani and his team were found the global prevalence rate of COVID-19 vaccine refusal among 41,098 nurses from 36 countries was 20.7%.The refusal rate of COVID-19 vaccination in Africa is not studied very well, and there was not

much work done by Berhe and his colleges in Ethiopia on the issue showed that ,about 38.5% of the medical professionals have declined the COVID-19 vaccination (4). The complex nature of motives behind vaccine hesitancy can be analyzed using the epidemiologic triad of environmental, agent and host factors (1). Environmental factors include public health policies, social factors and the messages spread by the media (12). The agent (vaccine and disease) factors involve the perception of vaccine safety and effectiveness, besides the perceived susceptibility to the disease (2). Host factors are dependent on knowledge, previous experience, educational and income levels. Previous studies have shown that vaccine hesitancy is a common phenomenon globally, with variability in the cited reasons behind refusal of vaccine acceptance. The most common reasons included: perceived risks vs. benefits, certain religious beliefs and lack of knowledge and awareness. The aforementioned reasons can be applied to COVID-19 vaccine hesitancy, as shown by the recent publications that showed a strong correlation between intent to get coronavirus vaccines and its perceived safety, association of the negative attitude towards COVID-19 vaccines and unwillingness to get the vaccines, and the association of religiosity with lower intention to get COVID-19 vaccines (15).Concerns about potential side effects were identified as one of the reasons for refusing vaccination (16).Recent reports suggest that many healthcare workers (HCWs) are also hesitant about or are delaying getting the COVID-19 vaccine (17). Some reports estimate that the rates of COVID-19 vaccination hesitancy in HCWs may be similar to rates in the general population. For example, a December 2020 Kaiser Family Foundation poll found that 29% of the HCWs were reluctant to get COVID-19 vaccines as opposed to 27% of the individuals in the general population (9). In contrast, in an early 2021 assessment of skilled nursing facilities across the United States conducted by Sallam and his co-workers , illustrated that more than three-fourths (77.8%) of the residents of these facilities compared to a little

more than a third (37.5%) of the staff in these facilities received at least one dose of the COVID-19 vaccine (10). These estimates are of concern even though HCWs were designated as priority groups for COVID-19 vaccination across the world. Given the scattered scientific evidence and a plethora of media reports, it remains to be known to what extent and why are HCWs hesitant towards obtaining COVID-19 vaccination. Thus, the purpose of this study was to review all published scientific evidence on the extent and reasons for COVID-19 vaccination hesitancy in HCWs. Also, we explored the enabling factors for COVID-19 vaccination across the world to assimilate similarities and differences in HCWs across the world as it relates to COVID-19 vaccination acceptance or willingness.

Earlier studies that assessed attitudes towards vaccines revealed the existence of regional variability in perceiving the safety and effectiveness of vaccination (14). Higher-income regions were the least certain regarding vaccine safety with 72%–73% of people in Northern America and Northern Europe who agreed that vaccines are safe. This rate was even lower in Western Europe (59%), and in Eastern Europe (50%), despite the presence of a substantial variability in Eastern European countries (from 32% in Ukraine, 48% in Russia, to 77% in Slovakia). However, the majority of people in lower-income areas agreed that vaccines are safe, with the highest proportions seen in South Asia (95%) and in Eastern Africa (92%) (15). A similar pattern was observed regarding vaccine effectiveness, with Eastern Europe as the region where people are the least likely to agree that vaccines are effective, as opposed to South Asia and Eastern Africa. The assessment of such regional differences can be invaluable in addressing and fighting public health threats posed by vaccine hesitancy. The current coronavirus disease 2019 (COVID-19) pandemic does not seem to show any signs of decline, with more than 1.7 million deaths and more than 80 million reported cases worldwide, as of

27 December 2020. The ebb and flow of COVID-19 cases can be driven by human factors, including attitude towards physical distancing and protective measures, while viral factors are driven by mutations that commonly occur in severe acute respiratory syndrome Despite the huge efforts made to achieve successful COVID-19 vaccines, a major hindrance can be related to vaccine hesitancy towards the approved and prospective COVID-19 vaccination. In addition, some people emphasized that their own immune system was strong enough to deal with a possible infection and therefore they did not need vaccination. According to their own statements, some of them relied on preventive and supportive measures like a balanced diet or taking supplemental vitamins to bolster up their immune system, rendering vaccination, in their opinion unnecessary (5).Another reason to refuse vaccination were users' concerns about various potential side effects and possible vaccine-related damage. Some users justified rejecting vaccination citing the lack of long-term studies and insufficient reliable information about side effects and consequential damages. Among others, these fears were related to the risk of getting cancer, changes and damages to their genetic makeup, infertility and death. These concerns were often associated with past vaccine and drug scandals (18).Another reason for users refusing vaccination was that some did not feel sufficiently informed about the vaccination and that the available information was perceived as incomprehensible. This lack of transparent and user-oriented information in some cases resulted in the spread of misinformation and conspiracy theories. The lack of knowledge led to a general mistrust and a negative attitude towards information on the disease itself and vaccines among some of the users. These beliefs, which were mostly based on misinformation or conspiracy theories, led to strong downplaying or denial of COVID-19 among users and a subsequent lack of willingness to get vaccinated. Mistrust in authorities, political stakeholders or in representatives of the pharmaceutical industry also played an important role. There

were doubts about the reliability and integrity of information and the intentions of certain groups, organizations or institutions in promoting vaccination, which users attributed to previous misconduct. For example, users were convinced that the pharmaceutical industry had a mere financial interest in promoting vaccination against COVID-19 development and approval of the vaccines compared to previous vaccines against other diseases was another reason given by users for refusing vaccination. They expressed concern that the vaccines were not sufficiently tested and that long-term negative physical consequences could not be ruled out. The partial emergency approval of the vaccines also led to concerns. Also, vaccines from specific manufacturers were sometimes rejected. Users justified this with differences in perceived effectiveness and suspected side effects of vaccines from certain manufacturers. The respective country of development or production also played a role in rejecting these vaccines (19).Spiritual or religious beliefs, such as the protection by God or the protective effect of precious stones, also led to a refusal of vaccination against COVID-19 by some users (20).

Chapter three

Materials and Methods

3.1. Study design

This is a cross-sectional hospital-based study. A sectional survey was conducted among a group of MCP at Omdurman teaching hospital in Khartoum city.

3.2. Study area

The study was conducted in Omdurman teaching hospital in Khartoum city, Sudan.

This hospital was selected due to the presence of an estimated number of trained and qualified medical staff, as well as its strategic location, where this hospital was adopted because it covers large population area with high number of MCP, and the quality of the medical service provided, covering all specialties as well as providing patients with diagnostic capabilities.

3.3. Study Population

All medical care providers including physicians, pharmacists, nurses, laboratory technicians – x- rays' technician, and physiotherapists who concern with covid-19 vaccine.

3.3.1. Inclusion criteria

- Medical service provider in the target hospital.
- Accept to participate in the study

3.3.2. Sampling

Sample size was calculated using Yamani formula: n= N/1+N € ² where:

n= sample size **N=** population size=600

e= level of precision or sampling of error = 0.04

Total population = <u>307</u>

3.4. Data collection

Similar to how cross-sectional studies on medical professionals' rejection of the COVID-19 vaccination are carried out. Direct interview with medical professionals who have declined the covid-19 vaccination in Omdurman teaching hospital, Khartoum, Sudan was conducted to fill out the questionnaires. Followed by the research supervisor's evaluation and revision of a results, the obtained findings were compared with those from other studies conducted all through world.

3.5. Study variables

The independent variable (Demographic data) such as age, sex, religion, marital status, profession, and work areas.

Dependent variables such as vaccine status (vaccinated or not), and reasons of refusing.

3.6. Data management and analysis:

Data was entered, cleaned, and analyzed using SPSS program

3.7. Ethical considerations

Written ethical clearance and approval were reviewed and approved by Scientific Committee of Napata College. Study participants were also given a full right to refuse/withdraw from the study process at any time in the study process. Participants in the study were informed about the purpose of the study and the privacy of information provided. Written informed consent for participation was required for this study in accordance with the national legislation and the institutional requirements.

Chapter Four

Results

4.1. Data analyses

In Table 1, there is a total 307 medical care providers (MCP) were included in the study. Mean age of the respondents was 28.65 years old. Most of the MCP were females 186 (60.6%), while 121 (39.4%) were males (Figure 1). Doctors 159 (51.7%), Nurses 107(34.8 %), Laboratory technician 25 (8.1%), Anasethia technician 10 (3.2%), pharmacists 6 (1.9%) (Figure 2). Also, 225 (73.28%) participants who are less than 31years old, followed by 62 (20.19%) between 31-40 years old, last group was 20 (6.5%) more than 40 years old (Figure 3).

4.2. Source of information about COVID-19 vaccination

Final analysis of 307 MCP showed that there is a clear difference and discrepancy in the source of information, whether about the Covid 19 or the vaccination of COVID-19. Social media sources were the most common source of COVID-19 information (47%), followed by scientific and medical journals source (28%), 17 % were based on their information from WHO web site, about 4% from conferences and workshops, and only 2% from news and recent researches from trusted research centers (Figure 4).

4.3. Prevalence of COVID-19 vaccination acceptance and refusal rate

About 164 (53.43%) of MCP accepted to get COVID-19 vaccination as follows: 82 (26.7%) male, 82 (26.7%) females, 98 (31.9%) doctors, 44 (14.3%) nurses, 14 (4.5%) Laboratory technicians, 8 (2.6%) Anasethia technicians, based on the age group, 109 (35.5%) less than 31 years old, about 45 (14.6%) 31-40 years old, and 10 (3.2%) above 40 years old. While 143 (46.57%) refused to get vaccine .39 (1.7%) male, 104 (33.8%) females (Figure 5), 61

(19.86%) doctors, 63 (20.5%) nurses, 11 (3.58%) Laboratory technicians, 2 (0.65%) Anasethia technicians, and 6 (1.95%) pharmacists. Based on the age group, 116 (37.7%) less than 31 years old, about 17 (5.5%) between 31-40 years old, and 10 (3.2%) above 40 years old (Table 2).The Fisher exact test statistic value is 0.0011. The result is significant at $p < .05$ between doctors and nurses' .Job description value was significantly difference at $p < .05$ the p-value is .001214.statistically associated with COVID-19 vaccine refusal. Statistic value is 0.0001 in the gender category who refused and not refused to get covid-19 vaccine (Table 3).

Table 1. The disturbuation of data among medical care providers in the study

		No. (%)
Gender	Male	121 (39.4 %)
	Female	186 (60.58%)
Job	Doctor	159 (51.7%)
	Nurse	107 (34.8%)
	Lab.technician	25 (8.1%)
	Anasethia technician	10 (3.2%)
	pharmacist	6 (1.9%)
Age	Less than 31	225 (73.28%)
	31-40	62 (20.19%)
	more than 40	20 (6.5%)
	Total	307 (100%)

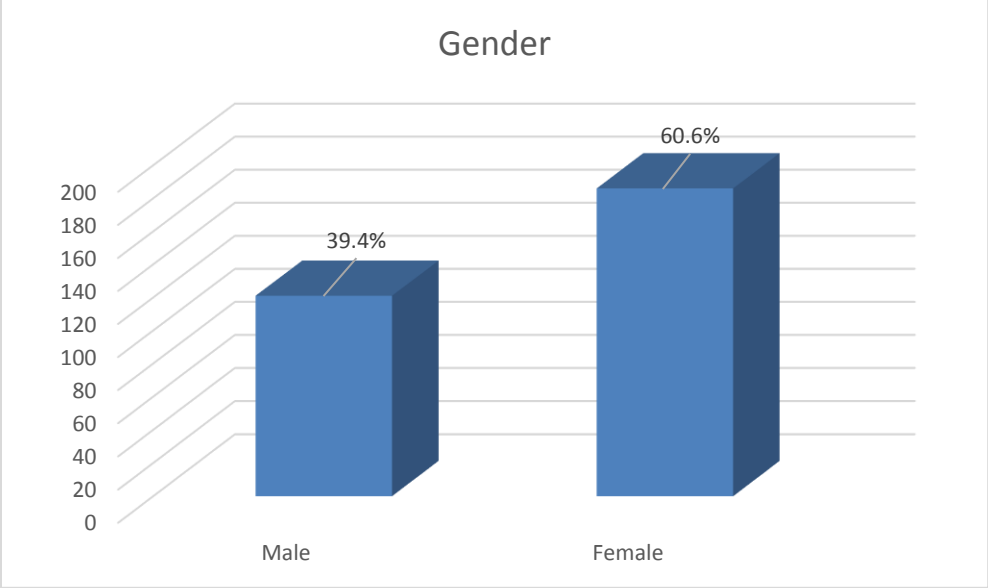

Figure 1. Gender disturbuation among the study population.

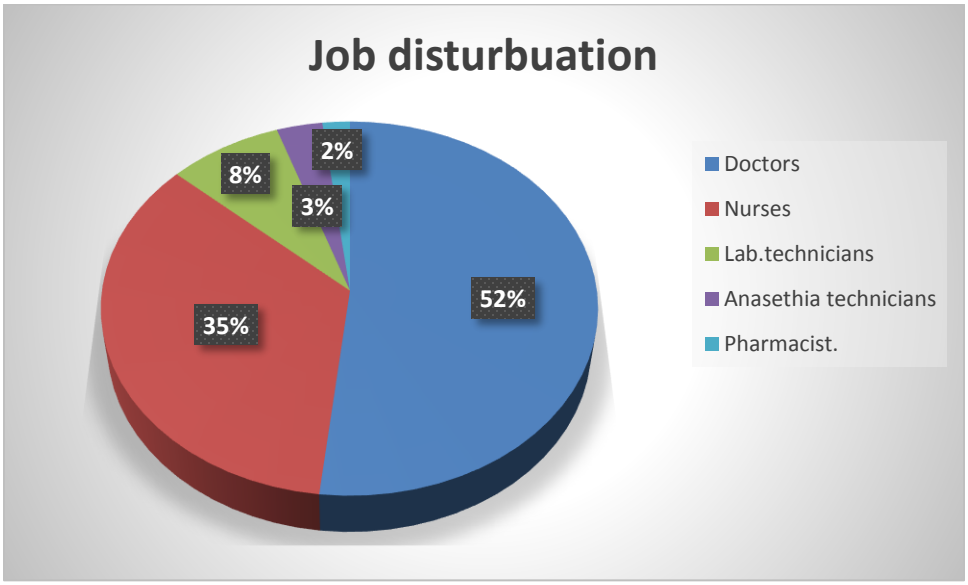

Figure 2. Job disturbuation among the study group.

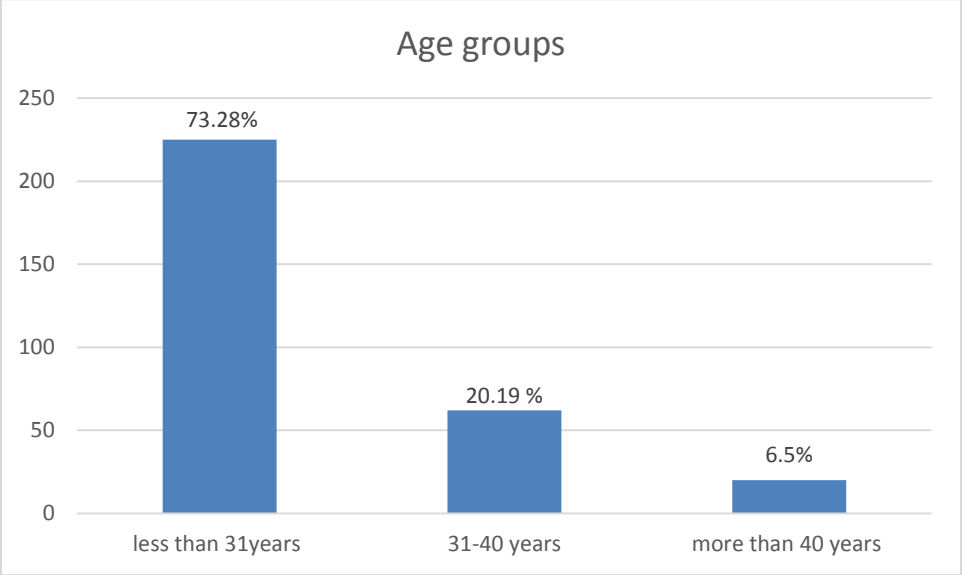

Figure 3. Age disturbuation among the study group.

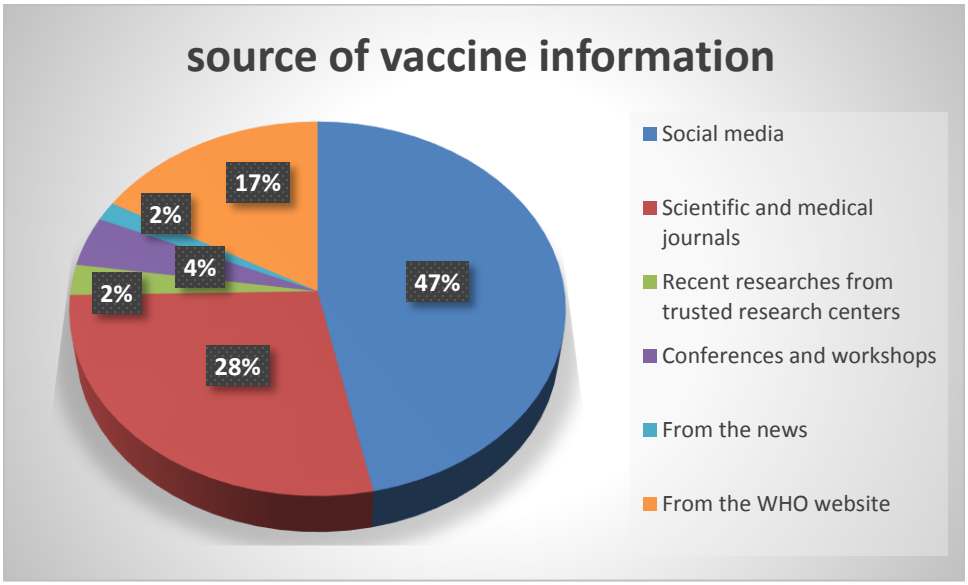

Figure 4. Source of information about Covid 19 vaccination among study group.

Table 2. Prevalence of COVID-19 vaccination acceptance and refusal rate among MCP.

Vaccine		Not Refused (%)	Refused (%)
Gender	Male	82 (26.7%)	39 (1.7%)
	Female	82 (26.7%)	104 (33.8%)
Job description	Doctors	98 (31.9%)	61 (19.86%)
	Nurses	44 (14.3%)	63 (20.5%)
	Laboratory technicians	14 (4.5%)	11 (3.58%)
	Anasethia technicians	8 (2.6%)	2 (0.65%)
	pharmacists	0	6 (1.95%)
Age /Years	Less than 31	109 (35.5%)	116 (37.7%)
	31-40	45 (14.6%)	17 (5.5%)
	more than 40	10 (3.2%)	10 (3.2%)
	Total	164 (53.43%)	143 (46.57%)

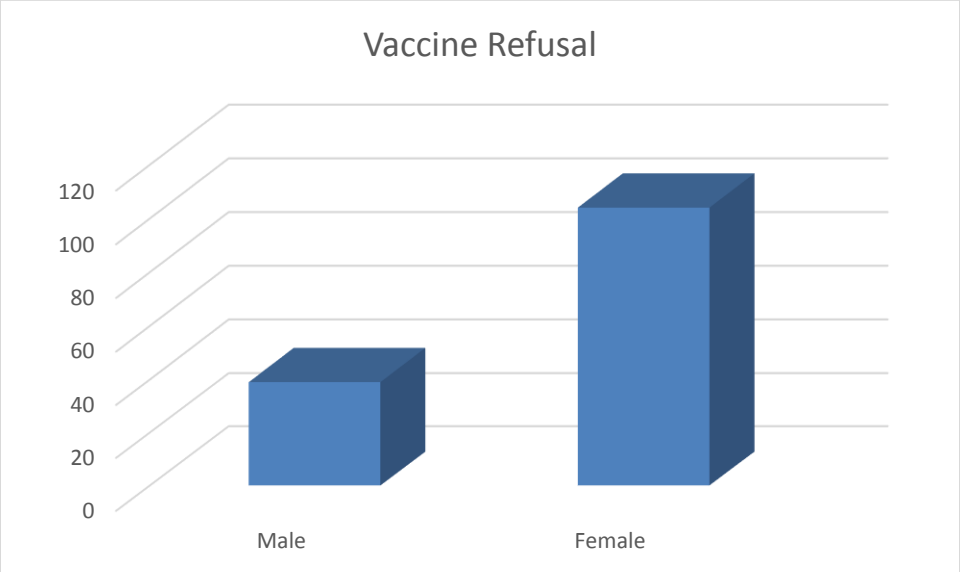

Figure 5. Vaccine refusal among males and females

Table 3. Statistical analysis of the data using Fisher Exact test (p value < 0.05).

	Not Refused (%)	**Refused (%)**
Male	82 (26.7%)	39 (1.7%)
Female	82 (26.7%)	104 (33.8%)
P value < 0.05	0.0001	

Doctors	98 (31.9%)	61 (19.86%)
Nurses	44 (14.3%)	63 (20.5%)
Laboratory technicians	14 (4.5%)	11 (3.58%)
Anasethia technicians	8 (2.6%)	2 (0.65%)
pharmacists	0	6 (1.95%)
P value < 0.05	0.001214	

4.4. Major reasons of refusal COVID-19 vaccine

Our analysis revealed three major categories of reasons for refusing a COVID-19 vaccination were identified: it's a new vaccine and there is no enough data, they don't believe in vaccine, and it has many complications (Figure 6).

About 8.3 % from doctors,3.7 % from Nurses, 8 % Lab.technicians,10 % Anasethia technicians ,and 33 % Pharmacists said they refused Covid 19 vaccine because it's a new vaccine and there is no enough data.6.4% doctors,14 % nurses ,4 % lab.technicians,10 % Anasethia technicians ,and 16.7 % pharmacists refused the vaccine because they don't believe in it. There is 4.48 % doctors, 11.2 % nurses, 16 % Lab.technician refused Covid 19 vaccine because it has many complications (Figure 7).

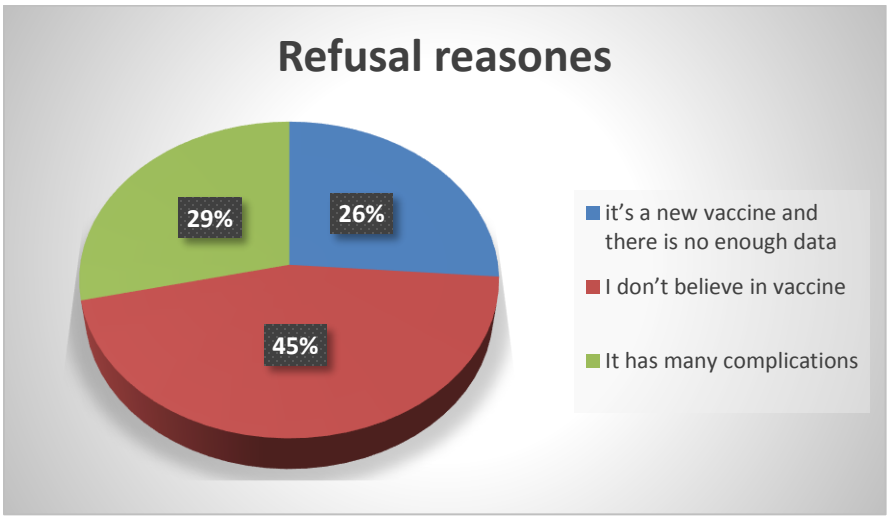

Figure 6. Disturbuation of refusal reasons among the study group.

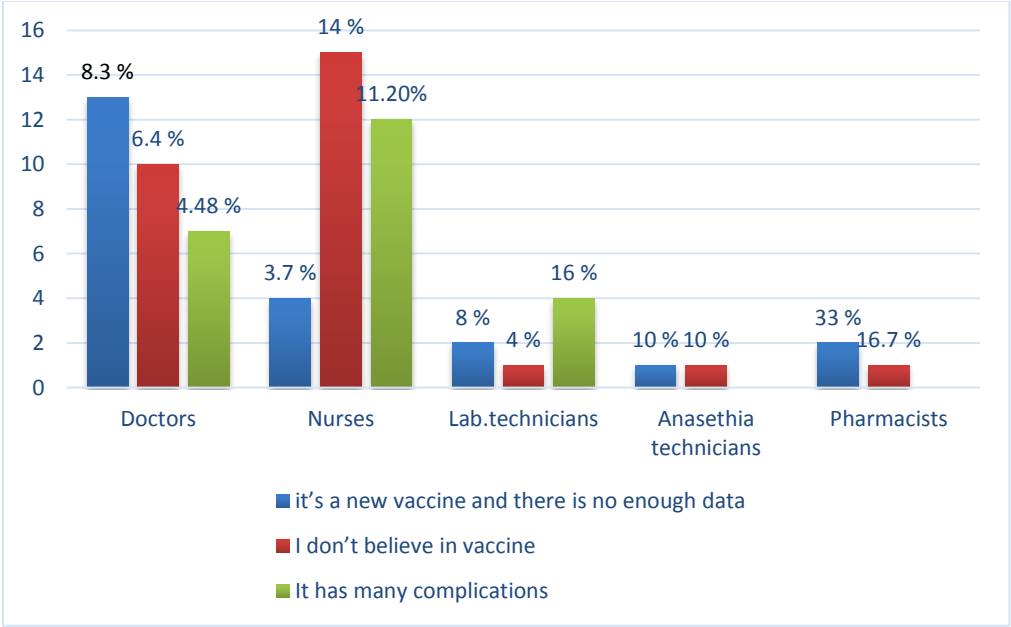

Figure 7. Disturbuation of major refusal reasons among the study subjects.

Chapter Five

Discussion

Vaccination is one of the most important strategies for the long-term management of the COVID-19 pandemic (12). Given that considerable proportions of the populations in many countries are still hesitant to get vaccinated (7), insights into reasons for poor vaccine acceptance are needed in order to inform public health measures aiming to further increase COVID-19 vaccination rates in the population. 46.57% refused to get Covid 19 vaccine. In our study most (33.8%) of the MCP were females, 1.7% males, The refusal levels of the COVID-19 vaccine among younger participants was higher 37.7% less than 31years old, while 5.5 years old between 31-40 years old, and 3.2 % above 40 years old.

These information gaps may be related to information not being sufficiently sensitive to the needs of the target group. For example, misinformation in social media provided by the social media (47 %) were using social media searching information about Covid 19 vaccine, it may not be trusted source, and suggests that there is a need to create credible and accurate information tailored to medical care populations who use social media as an information source (2). Information from untrusted journals and workshops (28 %) lacked a lot of credibility, so many did not rely on it. Even those who relied on their sources from the WHO (17 %) later questioned the organization because of the imprecision of its positions towards the pandemic (2). 4 % from conferences and workshops, may be due to difficulty of traveling at the time of pandemic to attend these conferences played a role in decision-making, and only 2% from news and recent researches from trusted research centers .Information on potential side effects of COVID-19 vaccination was one of a reasons of refusal. Misinformation on the different sources can also be an important reason for refusing vaccination. A low perceived benefit of the vaccination and a high risk of getting COVID-19

can also be counteracted. The present study investigated reasons of refusal COVID-19 vaccination among MCP. In our analysis, three main categories of reasons were identified, which reflect different opinions and views.

45% of the study group refused to get vaccine because they don't believe in vaccine, they have opinions about vaccination, its efficacy, when and where the clinical trials took place, and in general and that vaccine can be a source of disease.

Many of MCP (26%) said it's a new vaccine and there is no enough data and thought that vaccine against COVID-19 had not yet been sufficiently investigated or that they were not as effective as attenuated or inactivated vaccines.

Another reason to refuse vaccination were MCR concerns about various potential side effects and possible vaccine-related damage, the lack of long-term studies and insufficient reliable information about side effects and consequential damages. Recent study showed about 29 % refused to vaccine due to this reason.

The data obtained from this study are similar to other studies for example a study conducted in Germany by Fieselmann 2022 explaining these reasons (8).

Our findings are in line with studies from other countries, which have shown that, amongst others, poor perception of government and public health responses to the pandemic, concerns about vaccine side effects and safety, and unfavorable illness perceptions about COVID-19 such as a low perceived risk of infection are relevant reasons for poor uptake of COVID-19 vaccines (11) (4). With regard to vaccinations related to other diseases, similar reasons as in our and previous research on COVID-19 vaccine hesitancy were reported in other studies, such as a lack of confidence in vaccinations and a low perceived risk of contracting the disease (15).

Covid 19 vaccine is new vaccine for this reasons, doctors, nurses, Lab.technician, anasethia technicians, and pharmacists refused to get the vaccine (8.3 % 3.7, 8 %, 10 %, 33 %) respectively. While 6.4% doctors, 14 % nurses, 4 % Lab.technician, 10 % Anasethia technicians, and 16.7 % pharmacists, in another hand there is 4.48 % doctors, 11.2 % nurses, 16 % Lab.technician refused Covid 19 vaccine because it has many complications.

Nurses were more likely to refuse to get vaccinated to COVID-19 than medical doctors, a finding consistent with findings from Ethiopia (4). This may be due to the fact that the level of misinformation or disinformation toward the vaccine may be higher among nurses compared to medical doctors. Given nurses are the front-line workers in many departments of health facilities, this finding is extremely concerning.

Medical doctors staffs were came next to nurses more likely to refuse to get the COVID-19 vaccine, and more than laboratory technicians, Anasethia technicians, and pharmacists, this may be due to the fact that clinicians may be assumed that they are at risk of infection, severity, and morbidity than others. This study showed that younger age groups were less likely to refuse the COVID-19 vaccine, a finding similar to the studies conducted in France ((21), and the United Kingdom (11) .This could be owing to the active engagement of young MCP in various social media platforms, which are mostly disseminating.

Many studies including this study, have clarified a number of other reasons that influenced MCP decisions about vaccine.

Most of them feel inadequately informed about vaccination or do not understand the information available. Moreover, MCP may refuse a COVID-19 vaccination due to systemic mistrust in authorities (7), political stakeholders or representatives of the pharmaceutical industry (12). Still, because of the novelty of COVID-19, its tremendous impact on societies all over the world, further insights into individuals' perception about COVID-19 vaccines are

warranted (15). The aforementioned strategies aiming to promote COVID-19 vaccination uptake need to be further strengthened and evaluated with regard to their effectiveness.

Conclusion and Recommendations

A considerable percentage of Medical care providers (46.57%) refused to get COVID-19 vaccination. MCP of younger age groups, were highly likely to refuse to get vaccinated. These imply the need to target these sections, and the need to understand the refusal of COVID-19 vaccination. Moreover, the issue of refusal among health workers may also affect the general population by implication and hence, it requires serious attention. We recommend for researchers to conduct a qualitative study for an in-depth understanding of potential barriers to refusal, and also perform large-scale surveys by including additional variables.

It is essential to know the frequency and reasons for vaccine hesitancy and refusal and to develop a national vaccination strategy accordingly.

To the best of our knowledge, this is the first study in Sudan to investigate the readiness to get vaccinated against COVID-19.

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Appendix:

Questionnaire about Causes of refusing of covid-19 vaccination among medical care providers in Omdurman teaching hospital 2022.

Graduation project (5th year) -Medicine

Informed consent

Many medical care providers have doubts about receiving the Covid-19 vaccination and have chosen not to do so for a number of reasons with various backgrounds, and suspicion of the vaccine's effectiveness.

A descriptive cross sectional study is aiming to study the causes of refusal of covid-19 vaccine among medical care providers in Omdurman teaching hospital 2022.kindly would like to participate in this survey .in case of your participation, all information obtained will be top confidential and will not be revealed no matter what was the need. This study carried by us the third batch, faculty of medicine in Napata College for educational purposes and as graduation project.

I accept

……

Personal data:

Job description……

Department……

Age……

Gender: Male ( ) Female ( )

Marital status…….

1- Exposure to covid-19 patients. Yes ☐ No ☐ I don't kow ☐

2- Have you had covid-19? Yes ☐ No ☐ I don't kow ☐

If yes Yes ☐ No ☐

3- with no symptoms Yes ☐ No ☐

4- with mild symptoms Yes ☐ No ☐

5- with severe symptoms Yes ☐ No ☐

6- Do you have information about covid-19 vaccine? Yes ☐ No ☐

If yes what is the source of this information?

7- Social media Yes ☐ No ☐

8- Scientific and medical journals Yes ☐ No ☐

9- Recent researches from trusted research centers. Yes ☐ No ☐

10- Conferences and workshops. Yes ☐ No ☐

11- From the news Yes ☐ No ☐

12- From the WHO website. Yes ☐ No ☐

13- Vaccinated Yes ☐ No ☐

If no why? Yes ☐ No ☐

14- I was preferred certain type ,but it is over Yes ☐ No ☐

15- It is a new vaccine, and there is no enough data. Yes ☐ No ☐

16- Prefer to get herd immunity through others. Yes ☐ No ☐

17- I don't believe in vaccine Yes ☐ No ☐

18- It's a kind of jock Yes ☐ No ☐

19- Did not have enough information about the vaccine Yes ☐ No ☐

20- Did not think the vaccine is effective. Yes ☐ No ☐

21- Don't have enough time to take decision. Yes ☐ No ☐

22- I think the risk of vaccine is greater than its benefits (not safe). Yes ☐ No ☐

23- Preferred to get natural immunity through the infection of coronavirus. Yes ☐ No ☐

24- Has many complications. Yes ☐ No ☐

25- Covid -19 is just flu and no need for vaccine. Yes ☐ No ☐

26- I know people died after they got vaccine Yes ☐ No ☐

27- I heard about people died after they got vaccine Yes ☐ No ☐

28- I don't think the vaccine will protect me. Yes ☐ No ☐

29- Against personal freedom Yes ☐ No ☐

30- Against my religious ☐ ☐

31- Others Yes No

specify…….. beliefs.

Work plan

Description	September	October	November	December
Proposal and ethical clearance				
Data collection				
Data interring and analysis				
Graduation project writing				
Graduation project correction				
Graduation project submission				