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DOI: 10.46903/gjms/19.03.1016

REVIEW ARTICLE

PAKISTAN'S PERSPECTIVE ON COVID-19 VACCINES

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ABSTRACT

There has never been a pandemic of this magnitude in contemporary human history. In less than 16 months after the outbreak of the pandemic, almost 188 million confirmed COVID-19 cases and 2.5 million fatalities have been reported globally. In addition, a great deal of work has been done to discover vaccinations that are both safe and effective. In May 2021, 184 SARS-Cov-2 vaccine contestants were in pre-clinical trials, 105 were in clinical trials, and 18 vaccines had been licensed for emergency use by at least one national or international regulatory body. Till date, only 5 vaccines are given approval by WHO for emergency use that includes, Pfizer-BioNTech, Moderna, AstraZeneca, Sinopharm, Johnson & Johnson. These vaccines include entire virus inactivated or live attenuated, virus vector, protein-based, and nucleic acid vaccines. Currently, confusing information about the COVID-19 vaccination is being disseminated across the world. During health emergency, rumors spread and caused panic, insanity, and anxiety. SARS-CoV-2 strains, on the other hand, are constantly appearing over the world. This article provides a Pakistan's perspective towards COVID-19 vaccines with an updated review.

KEY WORDS: COVID-19; COVID-19 Vaccines; Conspiracy Theories; National Perspective; Therapeutic Misconception.

Cite as: Hassan T, Saleha S. Pakistan's perspective on COVID-19 vaccines [review article]. Gomal J Med Sci 2021 Jul-Sep; 19(3):111-6. https://doi.org/10.46903/gjms/19.03.1016

1. INTRODUCTION

1.1 Background: Millions of people worldwide have been afflicted by the COVID-19 pandemic caused by the SARS-CoV-2 virus. Researchers across the globe are working by dint off to develop COVID-19 vaccines that are both safe and efficacious.[1] Numerous potential vaccines are in the conduit or are in their nascent phases of clinical trials, while others are clinically accessible and have been authorized. Animal studies, as well as human trials, have already revealed possible tendencies toward achieving a high level of neutralizing antibodies.[2] Antibodies against SARS-CoV-2 spike proteins have shown promising results in terms of producing high titers in preclinical studies. In animal models such as mice and rhesus monkeys, proteolytic enzymes-based recombinant vaccines such as CoV-RBD219N1 and chemically inactive viral vaccines such as PiCoVacc have demonstrated a high degree of protective immunity. Other investigations have found that adenovirus vectored vaccinations induce significant levels of SARSCoV-2 antibodies.[3] The stated COVID-19 vaccination (ChAdOx1-nCoV-19) produced antibody titers ranging from 5 to 40 in rhesus monkeys' model. In a phase I study, a human adenovirus 5-vactored COVID-19 vaccine produced both live viruses neutralizing antibody titers and pseudo-virus neutralizing antibodies titers in healthy persons 27/28 days after vaccination.[4] Antibody titers produced by adenovirus vectored COVID-19 vaccinations were lower than those found in human convalescent plasma. Attempts have been undertaken to create vaccine candidates using the SARS-CoV-2 spike protein. Global public health officials are highly mobilized to deliver the largest-ever immunization effort to combat the COVID-19 epidemic.[5] As of May, 2021, 1.9 billion (35.2%) of the global total has been completely vaccinated, with 4.6 billion receiving a single shot. To date, the FDA and CDC has authorized and recommended Pfizer-BioNTech's COVID-19 vaccine, Moderna's COVID-19 vaccine and Johnson & Johnson's COVID-19 vaccine to contain novel coronavirus. Moreover, it is worth mentioning that FDA has approved the aforementioned vaccines

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Date Submitted: 02-06-2021
Date Revised: 25-06-2021
Date Accepted: 29-06-2021

for immunocompromised people, pregnant and lactating women, multiple sclerosis people, senior citizens. Pfizer's vaccine is about to get approval for minors aged 5 to 15 from FDA. The field of medicine continues to see radical new techniques for combating COVID-19, with the most recent development being in vaccination. India has approved the world's first DNA vaccine for use in an emergency against COVID-19, joining almost a dozen additional DNA vaccine candidates in clinical testing.[6] The ZyCoV-D vaccine works by priming the immune system against the virus that causes COVID-19 illness. It is also administered without the use of an injection.[7] This vaccine differs from the messenger RNA (mRNA) technology utilized in two of the currently approved COVID-19 vaccines, Moderna and Pfizer-BioNTech, both of which have received praise for their inventiveness. As of today, there are now 151 potential vaccine candidates, currently 41 potential vaccines are in stage 3 clinical studies. So far, 22 vaccinations have been approved in various countries.[8]

1.2 Vaccine's approval policies: Food and Drug Administration FDA is a regulatory body that approves scientific standards for every scientific medication including vaccines and drugs based upon their certain characteristics such as biocompatibility, biofabrication, safety, quality and efficacy.[9] The FDA also provides scientific assistance and regulation to researchers and vaccine developers, as well as evaluates vaccine clinical trial data prior to their approval. Because of the dire urgency of public health and the necessity of the vaccine's availability, the FDA expedited the clearance procedure.[10] The intermediate final rule with request for comments (IFC) covers CMS implementation of Section 3713 of the Coronavirus Relief, Aid, and Economic-Security Act (CARES Act), which is recognized as Medicare Part-B coverage and reimbursement for COVID-19 vaccination and administration.[7]

2. METHODOLOGY

This review was conducted in School of Pharmacy & School of Medicine, Changzhou University, Jiangsu, China from March, 2021 to May, 2021. In order to assess the perspective of Pakistani people towards COVID-19 vaccines, this review analyzed articles published for the period from January 2020 to May 2021 in both local and foreign journals. The main question of this paper was to assess the perspective of Pakistani people towards COVID-19 vaccines. To answer this question, different keywords; COVID-19, COVID-19 Vaccines, Conspiracy Theories, National Perspective and Therapeutic Misconception were separately and in combination searched in different electronic databases such as CINAHL, PubMed, Scopus, Web of Science, HEC digital library, and eMedicine. The article's inclusion criteria were based on the perspective of Pakistani people towards COVID-19 vaccines. Articles with copyright, irrelevant information and lacking the full text were excluded. A total of 53 articles were selected for this study, out of which in screening step, 27 articles after review of abstract, according to criteria and duplicates were removed. In last step, 26 articles were selected for the final analysis. The medium of language of all these articles was English.

3. DISCUSSION

3.1 COVID-19 vaccines in Pakistan: By May 2021, 34.8 million (15.8%) people in Pakistan have been fully vaccinated, while 93.6 million people have received single dose of vaccines. A lot more effort is needed to increase these digits. The health regulatory bodies in Pakistan have approved number of COVID-19 vaccines from different origins.[8] Chinese-based vaccines such as CanSino, Sinopharm and Sinovac, are being administered at broad level, Sputnik-V of Russia is also administering in Pakistan, United States-based Pfizer-BioNTech and Moderna's COVID-19 vaccine is currently administering in metropolitans. Britain's AstraZeneca is also administered on huge level. It is also important to mention that Chinese-based vaccine named CanSino also conducted its phase 3 clinical trials in Pakistan that received a public applause for promising results.[7-9]

3.2 Vaccine hesitancy in Pakistan: Vaccine hesitancy exists not only in Pakistan but it is a universal phenomenon and a problem of both developed and developing countries. According to World Health Organization (WHO), vaccine hesitancy is one of the major threats to public health worldwide. About 90% of the countries are facing some degree of hesitancy in people regarding vaccine acceptance. A study suggested that 49% of the Pakistanis are hesitant to get vaccinated against COVID-19.[11] There are certain reasons behind this hesitancy, the fact is that the vaccines were developed in Western countries, so they would not prefer Western-made vaccine. We are facing the same issue for many years in the case of Polio eradication. The rumors and fake news about the existence of coronavirus also develops hesitancy in people to get vaccinated. There is a need to find out what are the other religious, sociocultural and economic factors which create hesitancy among people.[12]

3.3 Misconceptions

3.3.1 Conspiracy theories: Conspiracy theories are spreading in Pakistan through popular media; it creates ambiguity in the minds of people and become one of the main reasons of developing hesitancy among people. They do not have any empirical evidence to support their false arguments

but the increasing rate of hesitation has become the critical challenge for Pakistan. Conspiracy theorist's perspectives are generally based on spreading fake news and misinformation about the vaccine. They might have less aware about education of public health.[13] According to them, vaccines have potential side effects. There is an example of well-known Pakistani political thinker who claims that vaccines have nano-chips that might control human bodies through the 5G internet. Another precedent of its kind stated that infected Israelis were better protected against the delta coronavirus strain than those who had the COVID-19 vaccine, which was already quite effective.[4,6,7]

3.3.2 Religious and sociocultural factors: Some of the religious leaders in Muslim countries opine that sharia laws do not approve vaccination for any disease, whether it is a COVID-19 disease or any other chronic disease. Another emerging concept related to religion is a concept of 'Halal'. Production of anything should be halal for Muslims, because 'Haram' is forbidden in Islam. So, the Muslim community also wanted to know about the ingredients and production of vaccines. For the purpose to get confirmation about its production, Indonesia, a Muslim majority country visited China's Sinovac COVID-19 vaccine factory in order to check the process and ingredients.[14] After getting confirmation, they declared Sinovac COVID-19 vaccine as 'Halal'. Moreover, many people spread rumors that there is no reality of coronavirus i.e., 'it is a Jewish conspiracy', 'it is the wrath of Allah', 'coronavirus cannot harm Muslims' 'it is a western-made vaccine'. Some people are reluctant to take AstraZeneca vaccine because it is manufactured in our arch-rival country (India) due to nationalism. Some other factors also inhibit the people to think rationally.[15] There are people in Pakistan, specifically in rural areas, where people are more linked with their traditional methods to cure their diseases i.e. they prefer homeopathy, home-made healing practices, alternative medicine or ethnomedicine to cure their diseases, rather than allopathic medicine. Majority of people across Pakistan also prefer to visit shrines to pray for their quick recovery. Hence, because of these reasons they also feel hesitation for vaccine. The other reason for non-acceptance among people from rural side is that the pandemic did not contract people there as it did in metropolitans.[16] Some other myths which can be heard from many people include, vaccines increase infertility among people, it disturbs menstrual cycle of females, there would be no advantage of injecting vaccine, you might be affected again from virus even after vaccination, pregnant women might give birth to an abnormal baby. Social media is playing havocs in spreading these rumors and misleading the people to a certain extent which create ambiguity in people regarding vaccination.[17] Some of the fake videos, public messages which are shared through social media have no reality in it, like there was a video of a nurse collapsing after vaccination and a death of a person after vaccination. Research argued that the country which has fragile healthcare system and a lot of economic issues, the only way to get rid of this pandemic is through vaccination.[18]

The western terminologies of 'positive' and 'negative' also caused too much confusion among the people such as the 'positive' is associated with everything is good but in the matter of COVID-19, positive means the person is affected by the virus and 'negative' means he is not being affected. So, these terminologies, while giving information to the people about their reports became a reason of creating confusion among people.[9]

3.3.3 Resistance towards vaccine: Vaccines are one of the modern medicine's most important, safe, efficient, and effective medicinal discoveries.[11] Meanwhile, the anti-vaccination movement, which can be traced back in 19th century when parents refused to vaccinate their children against smallpox in Leicester, United Kingdom has taken center stage alongside these life-saving discoveries. The refusals were based on some negative reports about the smallpox vaccine's side effects (Williamson, 1984). Anti-vaccination rhetoric has become an intrinsic part of the mainstream discourse of public health practice, as vaccine hesitancy has been amplified and strengthened on social media.[18]

Misinformation is ubiquitous on social media in today's era of fake news, and it is often more popular than genuine information.[19] Counter-efforts are required in such a hostile environment. In this context, both governments and social media outlets have several obstacles in preventing the spread of health misinformation and disinformation, particularly vaccine-related misleading content, via social media. Since the commencement of the COVID-19 pandemic, anti-vaccination movements have exploded.[20] Anti-vaccine accounts, for example, have gained about eight million followers since January 2020 and now have 58 million followers in the United States, the United Kingdom, Canada, and Australia, according to the Center for Countering Digital Hate (CCDH). This is a concerning figure since it could jeopardize the effectiveness of future vaccines to contain diseases and outbreaks. In other words, the rising presence of anti-vaxxers on social media is perceived as undermining public faith in vaccines.[21]

3.4 Efficacy and awareness regarding COVID-19 vaccines: It is proved that Sino-based COVID-19 vaccine (CanSino Biologic's COVID-19 vaccine)

was 67.7% effective in preventing the outbreak globally. The percentage was calculated using data from a variety of sources. Phase-III clinical studies of this vaccine conducted in a number of countries including Mexico, Russia, Chile, Brazil, Indonesia, Argentina and Pakistan. However, the Pakistani sub-set of the CanSino vaccine with 30,000 contestants, demonstrated that the defense rate was 74.8% against symptomatic cases, and 100% in serious cases illnesses.[8,22] Hitherto, Pfizer took the lead in efficacy as it is 95% effective against novel coronavirus, Moderna secured second position in this race with 94.10% efficacy, Sputnik-V showed 92% efficacy, Johnson and Johnson reported 86% efficacy against coronavirus, Sinovac showed 79% and AstraZeneca reported 70% efficacy. Despite all the insecurities, people are accepting the COVID-19 vaccines.[23] Pakistani health pantheons are organizing awareness programs on different media channels including news media and social media. Government is also playing a constructive role in this regard by sending awareness messages to people in their mobile phones, activating awareness caller-tunes regarding the efficacy and need of vaccination; it has imposed smart lockdowns in different vicinities and districts that are declared as high alert areas. Every kind of civic activities such as shopping malls, markets, eateries, private and public offices will remain closed till the situation settle down.[24] A complete ban on political, social, religious and cultural gatherings are also imposed. Similarly, all kind of inter and intra cities transport from these alerted areas is also prohibited.[4] Pakistan might face the same lockdown as previously if the number of cases increase and preventive measures are not taken accordingly. So, it is a precarious alarm for the residents of Pakistan to take this vigil seriously.

3.5 Vaccine acceptance rate: Individuals in Pakistan are being immunized with the COVID-19 vaccine in a staged method in order to acquire herd immunity. Researches reveal that medical students, males and healthcare workers are more likely to receive the vaccine, and that administering the vaccine for free increases the likelihood of mass vaccination.[25] Regardless the expense of vaccination, statistically, a higher number of people wanted the vaccine whose efficacy is 95% than those with a 50% efficacy rate. In previous surveys, it was disclosed that proper public knowledge is a major factor of infection prevention and control. During the first wave of COVID-19 infection in Pakistan, a major cross-sectional study including 1,250 Pakistani citizens indicated that 92.3% of the surveyed population had adequate understanding about COVID-19 preventative measures, in contrast to the more severe second wave.[26]

According to studies, 70.1% of the public would accept the vaccine if it was available and is suggested by a reliable source. The findings resemble to those of India; where the general public's acceptance of vaccines was determined to be 74%. Scientific research indicates that countries with higher literacy and income had lower vaccine acceptance rates, with 67% in the United States and 64.7% in Saudi Arabia.[11,16]

According to the findings, if a paid vaccine with 95% and 50% efficiency became available, only 77.1% and 41.2% of participants would acquire it, respectively. If the two vaccines were made free of charge, however, acceptability would rise to 85.4% and 55.7%, respectively, for vaccines with 95% and 50% effectiveness.[7,9]

4. CONCLUSION

Since the start of the pandemic, vaccine acceptance has become a great conundrum all over the world. Even rich countries have often struggled to roll out vaccines but in Global South, things are much worse. Pakistanis have become less likely to accept a COVID-19 vaccine since the pandemic has started and still the acceptance rate is less due to different assumptions based on conspiracy theories, lack of knowledge, traditional values and ideas, misinformation on social media, and many other reasons which we have mentioned before. We can overcome this ambiguousness and hesitancy among people by enhancing more knowledge related to vaccines that it is a simple, safe and effective way of protecting against harmful diseases. Vaccines train the immune system and create antibodies; there is nothing hazardous in it. We can also work on its easy availability for all the people in rural and urban areas and there should be a legal constraint for the people who are not vaccinated as Government is already working on it.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
GRANT SUPPORT AND FINANCIAL DISCLOSURE
None declared.

AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	TH, SS
Acquisition, Analysis or Interpretation of Data:	TH, SS
Manuscript Writing & Approval:	TH, SS

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.