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# Causes and effects of vaccine hesitancy among international students- a rising public health concern: A systemic review

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**Abstract**--Introduction: Vaccine hesitancy was the biggest challenge with the pandemic having its own negative implications on the world in general. So many classes of people had different reasons as to why they didn't feel the need to get vaccinated and with the COVID vaccination mandate put in place, a lot of people rebelled against it which led to so much confusion when people felt they were discriminated against because of their distrust in the available COVID-19 vaccines. Method: Several alternative searches were conducted in this pursuit on Google scholar and PubMed to help gather the necessary information concerning the aforementioned topic. The meta-analysis highlighted in this respect comprised of exactly 8 articles. Said recommendations like assessment of efficacy of studies incorporated and also extensive research towards addressing some mentioned concerns should be done so as to head towards a solution-based-research. A questionnaire was also prepared to help collect necessary data in relation to the said topic. Result: To enhance overall wellness and making the people aware of the scientific data backing the vaccines efficiency. An outreach targeting the local areas

serving as a direct intervention by the government and vaccinated members of society to increase confidence and trust in the vaccine. To mandate employers, schools and other influential body to properly educate the people under them in regards to the vaccine, its workings and how it would benefit them. To properly enforce COVID appropriate behaviour and punishing those in violation of these behaviours. Especially those not wearing masks unjustified in public areas, not maintaining appropriate distance from other people and those spitting indiscriminately in public. Conclusion: The points brought forth during the study and some of the lessons learned therein have proved that there's need to adopt new strategies when it comes to addressing vaccine hesitancy in relation to the different kinds of people involved or rather there is need to classify different approaches in a specific selected group of individuals.

**Keywords---**Causes, Effects, Vaccine hesitancy, COVID-19, International students.

## **Introduction**

The invasion of the Covid-19 had so many detrimental effects on a large number of countries, the world at large. So many governments came together so as to help fight the pandemic even with a lot of financial and economic difficulties the pandemic brought upon the vast number of countries. (1) The emergence of the different kinds of vaccines was a major team effort by so many countries because the pandemic killed a lot of people and fast action was underway to help save the few who either survived or didn't get infected with the Covid-19. Vaccine hesitancy has been a worldwide problem when it comes to addressing or curbing different kinds of pandemics the world has faced and it has been observed or rather noted that the Covid-19 is one pandemic that has faced one of the highest levels related to vaccine hesitancy. (2) Some of the main reasons being. Most international students have been very skeptical when it comes to get vaccinated because of the misconception about the vaccines posted on social media sites. This has led to some form of discrimination related to the vaccination cards and the introduced covid-vax mandate which makes certain places and things inaccessible to international students. The mandate has certain implications because it outlined certain areas that not so many individuals were okay with or would not fully succumb to so easily. Some students were not allowed to take part in university exams because of not being fully vaccinated which made them protest against the decision for every person to get vaccinated. (3,4)

The vaccine has thus far proved to be a way forward towards addressing the Covid-19 and the new variants that seem to be getting out of control. Addressing the concerns of international students in this respect is very important especially because some feel it's not safe for them to get vaccinated because of some of the side effects associated with the vaccine. (5) There is need to make them understand how exactly the vaccine works and the main reasons behind the said side effects so as to subdue the cohorts of fear instilled in them by all the different views and posts associated to the efficacy of the Covid-19 vaccines. (6) The main

objectives of this study are to point out the main reasons in relation to vaccine hesitancy among college students especially international students who seem to be more sceptical about getting vaccinated. And secondly to highlight some causes of vaccine hesitancy among international students and lastly to analyse some information that international students would want to know so as to be more open to accepting the vaccine.

## **Methodology**

We performed a literature search in PubMed, Google Scholar and BMJ journals using the key words; Covid-19 vaccine hesitancy and its main causes and implications from articles around 2020 and 2021 respectively. The main selected articles were English based and the article synthesis is outlined in the PRISMA diagram given below.

## **Overall Outcome**

There was a slight apparent diffidence in relation to Covid-19 information and also the vaccine information and its core influence on vaccine hesitancy. Providing the right kind of information to individuals would make such a colossal difference in the decision of a vast number of people in relation to their decision towards vaccination. For the purpose of being at par with the studies to be incorporated under the criteria for inclusion, some extensive systemic review searches were also included or rather done.

## **Selected Studies And Extraction Of Included Data**

The entirety of the cited content brought forth had been screened for complete textual content evaluation, citations taken into account suitable have been retrieved. complete textual content papers have been independently evaluated for eligibility, applicable final results information, research facts have been extracted and entered beneath the headings Authors, year of publication and country, study design, sampling technique, pattern length, outcomes, and conclusion in descriptive content table.

Table 1: Core criterions of the study on the inclusion and exclusion basis

	INCLUSION	EXCLUSION
Study design	A variety of selected study designs	Not specified
Study population	International students	Indian students
Language	English	Other languages

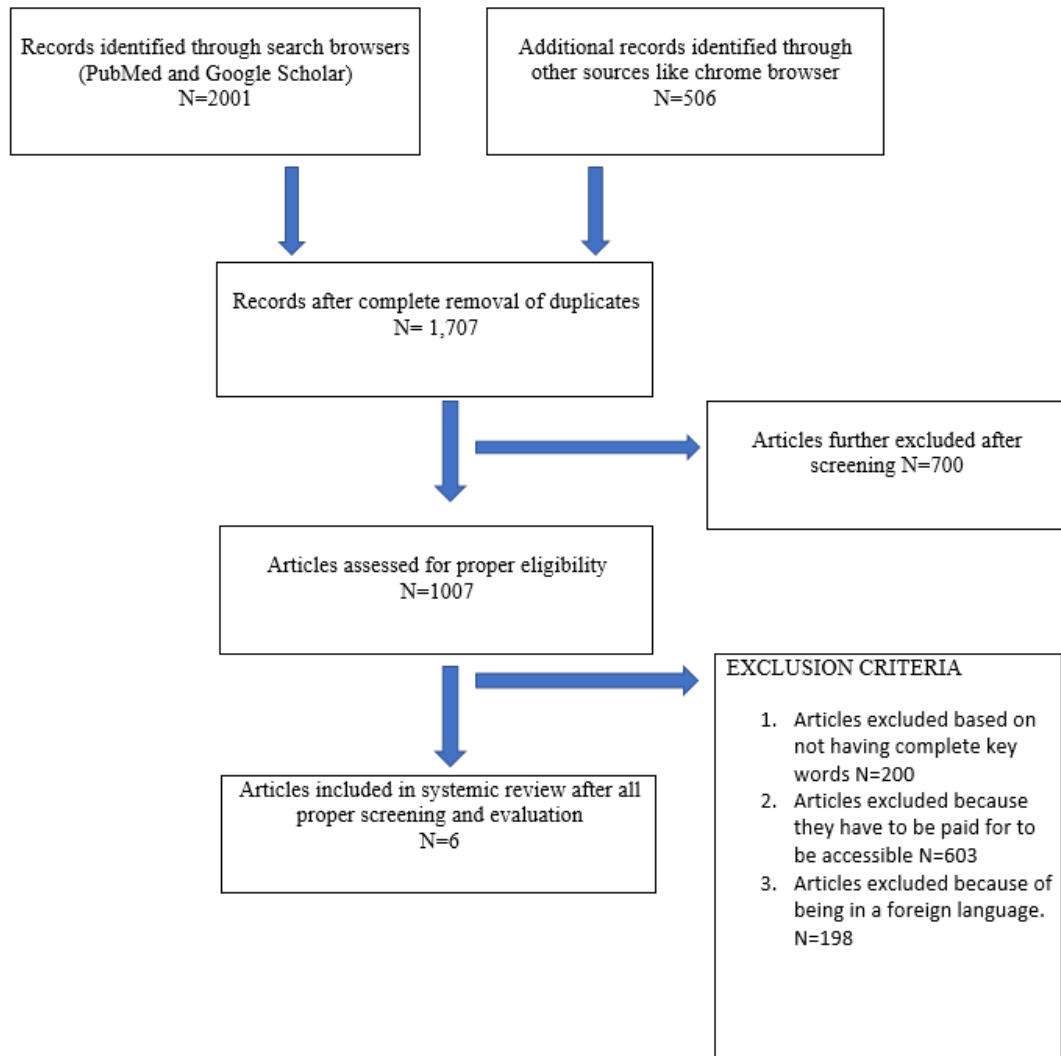


Figure 1: Prisma table of studies selected

## Data synthesis

The PRISMA declaration helps aid the synthesis and reporting of the outcomes or rather. A brief narrative of the authors, years of publication, kinds of intervention, surroundings, location or region, study population, key findings, and a description of the intervention results and p values for every study file is basically covered within the qualitative synthesis.

Six specific articles were selected in this regard with the key words the topic basically has and these articles were extensively analyzed. The origin of the studies were spaced out in different countries and were mostly cross sectional study designs irrespective of a few others. An analysis or rather brief detailed table of authors of the selected studies, study population, country, study design, techniques, study design, sample size and p values inclusive are entered in a table 3 below.

Table 2: Descriptive study table

Author/Year of publication	Objectives	Study design	Sample size	Results	Conclusion
Corey H. Basch, Zoe Meleo-Erwin, Joseph Fera, Christine Jaime & Charles e. basch  19 <sup>th</sup> February 2021  USA	A global pandemic in the time of viral memes: COVID-19 vaccine misinformation and disinformation on TikTok	Online survey	TikTok, an emerging social media platform  N:100 videos	This was believed to be the first study towards addressing vaccine hesitancy. The study brought out some facts about how social media and videos posted specifically on a site called TikTok all in the name of fun could actually influence people's decisions to get vaccinated	In total, the 100 videos studied garnered 35,338,600 views with an average of 353,386 (SD = 570,440). The videos collectively received 5,443,223 likes and 119,004 comments with respective averages of 54,432 (SD = 106,924) and 1,190 (SD = 2,385), respectively. One video was recorded and coded in Spanish, while all others were recorded and coded in English. In total, 35 videos used music and 14

					used dance. The videos using music accounted for 24.3% of the views, 28.3% of the comments, and 26.7% of the likes. Those that used dance accounted for 9.5% of the views, 19.0% of the comments, and 15.6% of the likes.
Rana k. Abu farha, karem H. Alzoubi, Omar F. khabour, mahmounf a alfaqih  20 <sup>th</sup> May 2021  Jordan	Exploring perception and hesitancy toward COVID-19 vaccine: A study from Jordan	cross-sectional design	The study population was the public at various parts of Jordan. 18 years old, Arabic speaking, and willing to participate in the study.  N: 1162 participants	The study remarkably brought out the number of participants who believed scientists have the proper tools to bring forth the available vaccines. Their perceptions reflect so much on the overall positive attitude in principle towards vaccines in general	During the entirety of the study periods, participants or rather subjects agreed to participate The mean and other values were remarkably high
Wen-Ying Sylvia Chou and Alexandria Budenz	Considering Emotion in COVID-19 Vaccine Communication: Addressing Vaccine Hesitancy and Fostering Vaccine Confidence	Cross sectional study design	Records analyzed of different reasons of vaccine hesitancy and how to address it	Several emotions that can be leveraged were explicitly highlighted in the commentary. Communication is key towards addressing certain concerns patterning to vaccine	In communities with pervasive heightened emotions, care must be taken to attend to those emotions rather than inadvertently heightening them in ways that would be counterproductive in vaccine decisions.

				hesitancy	
Kuldeep Dhama , Khan Sharun, Ruchi Tiwari, Manish Dhawan, Talha Bin Emran, Ali A. Rabaan, and Saad Alhumaid 30 Jun 2021 India	COVID-19 vaccine hesitancy – reasons and solutions to achieve a successful global vaccination campaign to tackle the ongoing pandemic	Case study	Vaccinated records in each state	A proper program patterning to covid 19 concerns if implemented would make significant changes. The discouragement of people who hope the vaccine would get things back to normal is one more reason that leads to vaccine hesitancy.	The barrier of vaccine hesitancy needs to be broken completely for the benefit of safeguarding and sustaining global health amid the present crises due to the ongoing pandemic. COVID-19 vaccination is necessary and preferably has to be made mandatory for all, irrespective of the community and country.
Fadia Dib, Philippe Mayaud, Pierre Chauvin & Odie Launay 24 <sup>th</sup> February 2021 Paris, France	Online mis/disinformation and vaccine hesitancy in the era of COVID-19: Why we need an eHealth literacy revolution	Cross sectional study design	French speaking people and other interested party's	The world is becoming more and more digitalized. Adopting some digital ways is a given to keep at par with the said changes. This such paths should be promoted as life-long key competencies in this regard	Applying technological advancements like e-health literacy skills is a positive way towards becoming an essential need
Cato T. Laurencin 30 <sup>th</sup> March 2021 USA	Laurencin CT. Addressing Justified Vaccine Hesitancy in the Black Community.	A cohort study	The black communities in USA	In summary, concerns raised by the black community were believed to be completely justified even though the advisement	The Johnson and Johnson vaccine was made available along with the Pfizer and Moderna Vaccines. Soon, vaccines will be produced by

				towards vaccination is still very much recommended	other companies and will be in broad supply
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Table 3: Descriptive table of the Studies selected

Authors	Population	Country	Year	Sample size	Study design	Sampling method	P value
Corey H. Basch, Zoe Meleo-Erwin, Joseph Fera, Christine Jaime & Charles e. basch	Tiktok users	USA	2021	100 videos	Online survey	Simple random sampling	N/A
Rana k. Abu farha, karem H. Alzoubi, Omar F. khabour, mahmounf a alfaqih	18-year-old teenagers and those willing to participate	Jordan	2021	1162	cross-sectional design	Simple random sampling	<0.005
Wen-Ying Sylvia Chou and Alexandria Budenz	Chinese people	China	2021	Over 500 records	Cross sectional study	Simple random sampling	N/A
Kuldeep Dhama , Khan Sharun, Ruchi Tiwari, Manish Dhawan, Talha Bin Emran, Ali A. Rabaan, and Saad Alhumaid	Indian citizens	India	2021	Over 1,000	Case study	Simple random sampling	<0.001
Corey H. Basch, Zoe Meleo-Erwin, Joseph Fera, Christine Jaime & Charles e. basch	French speaking people	Paris, France	2021	Over 500	Cross sectional study design	Stratified sampling	N/A
Cato T. Laurencin	The black community	USA	2021	Black community	A cohort study	Simple random sampling	<0.005



## **Results**

The selected articles or rather references included in this review were sourced from google scholar, PubMed and also other search browsers in select countries mainly in the year 2020 and 2021 based on the pandemic years and vaccine introduction. The articles are all English based articles. The initial search comprised of about 2507 articles that resurfaced based on the actual topic under research. Duplicates were removed and about 1,707 articles were further assessed and after some further screening based on the nature of the articles, 1,007 articles remained under consideration. An exclusion criteria was then applied and 200 articles did not qualify because of not having appropriate key words, 603 were excluded because they were not accessible and 198 articles were in a foreign language. The remaining 6 articles that highlighted the information needed to aid the study have been included in this review.

### **Overall description of included studies**

The first study included vaccine hesitancy in general and possible solutions towards addressing concerns related to it to achieve a global vaccination. It was highlighted in the article that there is need to set up a program to help address issues connected to vaccine hesitancy. The second and third articles considered certain aspects of vaccine hesitancy and how to address the specific emotions. The two studies remarkably brought out the belief that scientists are interested in the health of individuals and only addressing certain concerns individuals might have will help drive towards finding probable solutions towards curbing vaccine hesitancy. The fourth article brought out the effect of some social media sites in relation to its effects on vaccine hesitancy. The specific site is TikTok where people would make funny videos in relation to the pandemic and the vaccines. The whole concept was all fun and games but it had different effects on the perception of vaccines and hence resulted in the negative attitude towards vaccines. The last study mainly focused on the black community and it explained that the feelings people have towards the vaccines are somewhat justifiable because of the less information provided in this regard but then getting vaccinated is a way towards curbing the spread of the virus so it is very important to address concerns that cause vaccine hesitancy.

### **Main observations/suggestions based on the results**

- To enhance overall wellness and making the people aware of the scientific data backing the vaccines efficiency.
- An outreach targeting the local areas serving as a direct intervention by the government and vaccinated members of society to increase confidence and trust in the vaccine.
- To mandate employers, schools and other influential body to properly educate the people under them in regards to the vaccine, its workings and how it would benefit them.
- To properly enforce covid appropriate behaviour and punishing those in violation of these behaviours. Especially those not wearing masks unjustified in public areas, not maintaining appropriate distance from other people and those spitting indiscriminately in public.

## Quality assessment

Strobe checklist was intensively used to coordinate the analysis highlighted here. With knowledge that Incomplete and inadequate reports of literature or rather research hampers the analysis of the strengths and weaknesses of the studies to be carried out and even those reported.

Table 4: Summary of quality assessment

SN	Title (5)	Study design (5)	Key words (9)	Study sample (2)	Study Population (4)	Result (5)	Addressing vaccine hesitancy (5)
1	2	2	4	1	2	3	2
2	2	3	5	1	2	2	2
3	3	2	5	1	3	4	3
4	2	1	6	1	2	4	3
5	3	1	5	1	2	3	3
6	4	3	8	1	4	5	4

## Discussion

The main purpose of this study is to specifically highlight the causes and effects of vaccine hesitancy among international undergraduate and postgraduate students. Being a foreign student in a foreign land comes with a vast number of challenges. International students especially have to face so much racism from Nationals sometimes based on their color. These factors were actually hastened prior to the Covid-19 vaccine mandate and the skepticism of certain internationals to get vaccinated. Many were skeptical mainly because of feeling unsafe being far away from their families and having to face the side effects of the vaccine and every other assumption brought forth online, most especially on social media sites where so many individuals expressed disbelief in the vaccines and their efficacy.

As observed in the study done by analysing responses to a TikTok video that was initially meant for fun or rather jokes about the covid-19 vaccines, most people are easily influenced by these posts because their subconscious convinces them that the said might have some truth to it (1), this is something that was in relation to the findings of this current study. In light of the evaluation or rather results obtained from some related articles, The benefits of the vaccine are undeniable, however, such statements as the unvaccinated are a great danger to society is by its nature grossly erroneous (2). As the reality has proven that both the vaccinated and unvaccinated are susceptible to the virus, the only difference pointed out is that the vaccinated stand a greater chance at survival (4). Being vaccinated in no way cures the virus neither does it lock the virus within a person's body preventing its spread.

The vaccines have been a way of mitigating or rather curbing the virus spread so compliance to a certain level is very important. If vaccine hesitancy is not

addressed early, then more problems will arise if the world ever faces such a crisis (5). These matters should be discussed extensively and every individual's concerns should be regarded as important because each person has the right to free will so the decision to get vaccinated should not be frowned upon but rather a matter of asking the right questions so as to provide the right answers to the person's concerns regarding the vaccine and the works of them. Further studies need to be surely conducted in this respect to avoid any detrimental outcomes in future.

## **Conclusion**

Addressing vaccine hesitancy in all aspects is very important for a vast number of reasons, some of which have been highlighted in this review. The findings contained in this report highlight just how certain concerns related to being a foreigner in a country should be addressed when it has something to do with making important decisions related to someone's life. The points brought forth during the study and some of the lessons learned therein have proved that there's need to adopt new strategies when it comes to addressing vaccine hesitancy in relation to the different kinds of people involved or rather there is need to classify different approaches in a specific selected group of individuals.

## **Study limitations**

Some of the observed limitations through-out the study are that there are several studies done addressing vaccine hesitancy but none done specifically to address some concerns students studying in different or rather foreign countries would actually be facing in relation to having a positive outlook about the vaccines.

## **Acknowledgement**

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