COVID-19 VACCINE HESITANCY: A FACEBOOK ETHNOGRAPHY

by

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ABSTRACT

Vaccine hesitancy is a complex, multifactorial issue which has been posing a threat to global health since before the current COVID-19 pandemic (Peretti-Watel et al., 2015). The literature on social media use and vaccine hesitancy frames social media as a source of medical information and misinformation which can influence vaccination attitudes (Baccarella et al., 2018). However, social media can be thought of simultaneously as a part of the lived experience, as well as an online extension of it, where various vaccination attitudes and socio-political events can be encountered and debated. In this study, a qualitative online digital ethnography was carried out on Facebook to generate data on COVID-19 vaccine hesitancy in Malta. The results of this study give insights on COVID-19 vaccine hesitancy in Malta and its relationship with people's perceptions of scientific authority figures, their personal experiences with COVID-19 vaccines, local socio-politics, and social prestige associated with vaccination choices.

Keywords: vaccine hesitancy, COVID-19, social media, Facebook

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CHAPTER 1: INTRODUCTION

1.1 Setting the Stage

On a crisp Sunday afternoon in January 2022, hundreds of people gathered in front of Malta's parliamentary building in the capital city of Valletta with a common goal in mind: to protest a new government regulation prohibiting anyone without a valid COVID-19 vaccination certificate from entering social and recreational venues. As they filled the air with their chants of "liberty" and "no green pass", they made their way down to St. George's Square where they convened outside the Grandmaster's Palace. Many were brandishing placards and banners, displaying slogans reading "the vaccine is poison", "coercion is not consent", and "where there is risk there must be choice". Others symbolised the discrimination they would experience under the new regulation by wearing yellow star badges on their arms, a reference to Jews who were oppressed under the Nazi regime. Facemasks were noticeably absent from several of the protestors' faces in defiance of mask-wearing regulations. A spokesperson for the protestors called on Malta's Prime Minister to intervene on their behalf and derided the Health Minister for supporting the regulations, drawing cheers and applause from the crowd. Other speakers followed, denouncing the vaccine certificate system as a foot-in-the-door compliance tactic by the government and a way to coerce the population to get vaccinated. They also warned the congregation that inaction would lead to further erosion of their fundamental democratic rights. This event turned out to be the largest public demonstration against COVID-19 regulations in Malta to date.

While the protest drew to a close later that day, the same could not be said of the online debate which followed. The Times of Malta posted their coverage of the event on their Facebook page which drew hundreds of reactions and comments. On one hand, there were those who made fun of

the protestors, questioning their scientific credentials, dismissing their concerns, and accusing them of contributing to the spread of COVID-19 due to their refusal to get vaccinated. On the other hand, many people expressed support for the protestors, congratulating them for fighting for their rights, claiming they represented the majority of Maltese citizens, and ridiculing their detractors for letting themselves be blinded by the government's agenda of control. This vignette illustrates the main themes of this dissertation, these being the complex interplay between COVID-19 vaccine hesitancy, socio-politics, and science, as well as how this interplay can be embedded in and experienced through social media.

1.2 Vaccine Hesitancy and Social Media

Vaccine hesitancy is a complex issue to unravel due to its multifactorial nature and the lack of consensus on its very definition (Dubé et al., 2013; Falagas & Zarkadoulia, 2008). While this phenomenon has been brought into the limelight by mainstream media and internet coverage of the current COVID-19 pandemic it is by no means a novel problem, having existed for as long as vaccines themselves have been around (Bynum, 2008). Even prior to the pandemic, health experts around the world have been reporting decreasing uptake and increasing scepticism towards vaccines, with the World Health Organization (WHO) having named vaccine hesitancy as one of the global health threats in its 2019 agenda (Peretti-Watel et al., 2015; WHO, n.d.). One of the many factors which has been studied in relation to vaccine hesitancy is the use of social media as a source of health information and misinformation and how this may influence vaccination attitudes (Baccarella et al., 2018). However, social media is more than simply a repository of knowledge; it is an online venue where people from different 'internets' converge (Miller & Slater, 2000), a venue which is experienced uniquely by each individual since this online medium is

shaped by each individual's interests, internet activity, and online contacts. For many, social media is simultaneously an online extension and an inextricable part of their lived experience.

1.4 Malta and COVID-19

An overview of the Maltese context on COVID-19 vaccination is needed to frame the rest of this dissertation. Malta has distinguished itself by having one of the fastest rollout campaigns in Europe (ECDC, 2022). Cuschieri et al. (2021) described how the Maltese government started its vaccine rollout in December 2020 after having secured an abundance of vaccines early on, rapidly opening large quantities of vaccination hubs and systematically targeting specific population groups in a staggered fashion, starting from frontliners and vulnerable populations. This led to a "resounding success with high population uptake across all ages" (Cuschieri et al., 2021, p.4), which, according to the authors, was in large part due to low levels of vaccine hesitancy.

However, later events seemed to contradict, or at the very least challenge, this assertion. ECDC data in September 2022 showed a decrease in vaccine uptake, with only 68.1% of the Maltese taking the booster shot compared to the 86.2% who took the primary course of the vaccine (ECDC, 2022). While the booster was still taken by most people, and while Malta remained one of the leading European countries in terms of vaccine coverage, the drop in vaccine uptake is still noticeable. No shortage of vaccines was reported, which suggests that vaccine hesitancy may have increased over time. There has certainly been a lot of recent debate on issues such as vaccine certificates, COVID-19 restrictions, and conflicts between science and politics which may have dented the Maltese drive to get vaccinated. These debates, and by extension the local socio-political context in which vaccines are nested, have seeped into social media with the potential to influence many people's attitudes and decisions regarding COVID-19 vaccines. Thus, examining

COVID-19 vaccine hesitancy through a medium such as social media can give valuable insights into the local barriers to vaccine acceptance. The relevance of this study also extends beyond the pandemic since examining vaccine hesitancy can also contribute to our understanding of the Maltese people's attitudes towards public health, scientific authorities, and government.

1.4 Research Questions

This backdrop led to the formulation of the primary research question for this dissertation:

> How can COVID-19 vaccine hesitancy be produced in the context of social media in Malta?

To answer this question, an online digital ethnography was carried out on Facebook to generate information by experiencing social media as a typical Facebook user would. Further sub-questions were then raised in light of the emerging data.

> Q_1: How are scientific and medical authorities perceived, invoked, and subverted in the context of vaccine hesitancy on Facebook?
>
> Q_2: How do people's personal experiences and vaccine-related anxieties, as expressed on Facebook, fare against health experts' advice?
>
> Q_3: How can vaccine hesitancy be constructed by social life and politics?
>
> Q_4: What can people's Facebook interactions reveal about the social connotations they ascribe to different vaccine-related choices and opinions?

1.5 Dissertation Structure

This dissertation starts with a literature review on vaccine hesitancy, including its definitions and influencing factors, and on social media both as a source of health information as well as an online

social venue. This is followed by a section on the research method used and the ethical considerations of this study. Next is the data analysis section in which the main findings and themes are presented and analysed. Lastly, the dissertation ends with a discussion of the data, how the research questions were addressed, and concluding remarks.

CHAPTER 2: LITERATURE REVIEW

2.1 Defining the Problem

There is a lack of consensus on the definition of vaccine hesitancy; the term has mostly been used as a catch-all category to describe a highly heterogeneous population of people who may delay or refuse vaccines, or only find objections with particular vaccines while accepting all others (Peretti-Watel et al., 2015). As a starting point, one can consider the definition coined by the SAGE working group on immunisation, this being a "delay in acceptance or refusal of vaccination despite availability of vaccination services" (MacDonald, 2015, p.4163). Using this definition, hesitancy can be observed and measured by comparing the projected vaccine uptake in a given area to the actual number of vaccinations. However, this definition has been criticised as it focuses only on the behavioural aspect of the phenomenon without considering the complex decision-making processes and sociocultural factors which influence such behaviour (Dubé et al., 2016; Peretti-Watel et al., 2015). Furthermore, people may accept a vaccine while harbouring reservations on doing so, and therefore measuring vaccine uptake might not be an entirely accurate method by which to assess vaccine hesitancy in a population.

There is also the issue of anti-vaccination, a term which can sometimes be erroneously conflated with vaccine hesitancy. This is somewhat understandable as the two concepts share a significant amount of overlap; they both share behavioural outcomes and are both associated with exposure to medical misinformation. However, hesitancy is usually associated with a more ambivalent and nuanced relationship with vaccines and with greater potential for vaccine acceptance when doubts are addressed by scientific evidence. On the other hand, anti-vaccination is associated with a stance of resolute opposition towards vaccines, carries with it a more negative connotation, and is

associated with belief in medical conspiracy theories (Dubé et al., 2021). Therefore, while anti-vaccination technically falls under the SAGE definition of hesitancy some authors prefer to treat it as a separate phenomenon (Peretti et al., 2015; Pertwee et al., 2022).

2.2 Influencing Factors

Vaccine hesitancy can be influenced by a number of interdependent individual and social factors, all of which are located within specific political, historical, and cultural contexts (Dubé et al., 2013; Peretti-Watel et al., 2015; Wynen et al., 2022). The following section shall describe some of these factors, along with application to the Maltese situation where relevant.

2.2.1 Accessibility

Availability, ease of access, and attractive public health programmes are vital to the success of vaccination programmes (Cordina et al., 2021; MacDonald, 2015). In the local context this did not seem to be a significant issue during the COVID-19 pandemic so far, with the success of Malta's vaccination campaign attributed to its sufficient supply of vaccines, efficient rollout strategy, and small geographical size (Cuschieri et al., 2021). Therefore, there were no vaccine accessibility issues that could have acted as a significant source of COVID-19 hesitancy in Malta.

2.2.2 Trust

In the context of vaccine hesitancy, trust can be seen as a process by which people put their faith in institutions, systems, or influential figures which they perceive to be competent, integrous, and working in their best interest of the general population (Wynen et al., 2022). By doing so, people knowingly submit themselves to the influence of their chosen 'trustees' in order to simplify complex vaccine-related decision-making (Amo-Adjei et al., 2022). The literature documents a

wide range of trustees which may or may not be directly related to healthcare, such as doctors, government institutions, influential public figures, mass media, and religious organisations (Dubé et al., 2013; Miko et al., 2019; Schmidt et al., 2018).

Trust in governments is a strong predictor of vaccine uptake in a population (Larson et al., 2018; Raffetti, 2022), since people would be more likely to get vaccinated if they trust the institution orchestrating the vaccination programme. However, in countries where governments or key political figures openly disparaged vaccines, trust in the government was linked to increased vaccine hesitancy; this was the case in Brazil, where hesitancy towards Chinese and Russian COVID-19 vaccines was associated with being a supporter for President Jair Bolsonaro, who frequently and publicly denounced them (Gramacho & Turgeon, 2021). This was probably not the case in Malta, where both major political parties vocally supported vaccination during the pandemic. Furthermore, a pre-pandemic Eurostat survey showed that the Maltese reported high levels of trust in their government ("Trust in Malta government", Times of Malta, 2018), suggesting that mistrust in Maltese public institutions may not have been a significant barrier to COVID-19 vaccine uptake.

Medical and scientific experts can also be trusted sources of information and recommendations regarding vaccines. Apart from having competence in their respective fields, experts can also be considered trustworthy if they are perceived to be independent from the government, or at least be seen as acting on scientific knowledge rather than on political agendas (Wynen et al., 2022). This brings to mind a couple of important figures in the Maltese COVID-19 scenario. The first is Prof. Charmaine Gauci, the Superintendent of Public Health, whose regular press conferences and sensible recommendations to mitigate the virus's spread (including advocating for vaccines) made

her the most trusted public official on COVID-related updates (Martin, 2020), as well as "a beacon of hope" for many Maltese people (Azzopardi, 2020). Her status as an expert, authority, and adherence to international medical guidelines may have contributed to this high level of trust, as well her consistency during a time of widespread social anxiety due to the pandemic. In stark contrast, the second figure is Dr. Jean Karl Soler, a family doctor who garnered a strong (albeit smaller) following due to his harsh criticism of lockdowns and other coronavirus restrictions, as well as his claims that COVID-19 mortality and the need for vaccinating healthy children have been greatly exaggerated (Diacono, 2021). Trust in a character such as Dr. Soler may have been due to his transparency regarding the scientific literature he quotes, his outspokenness on COVID-19 restrictions, the fact that unlike Prof. Gauci he was not backed by the state, and possibly also due to the strong reactions he received from Maltese medical authorities which made him appear to be exposing institutional incompetence or wrongdoing.

Healthcare professionals can also be regarded as medical experts and their influence is usually felt directly by the patients they interact with. This may be the case even if the professional does not have specialised expertise in vaccines, with this perception being simply due to their association with medical institutions. Thus, healthcare workers have an important role to play in fostering trust in healthcare institutions by creating suitable environments where vaccine hesitancy can be expressed, acknowledged, and assuaged (Dubé et al., 2016; Razai et al., 2021). People may be less likely to object to a vaccine suggested by their trusted physician (Dubé et al., 2013), especially if they perceive that their doctor is taking their concerns seriously by communicating candidly, unhurriedly, and respectfully (Marlow et al., 2007).

Trust can be volatile, especially during times of uncertainty or in the face of events which undermine previously held beliefs. A perceived breach of trust which may lead to COVID-19 vaccine hesitancy may take the form of vaccine researchers collaborating with for-profit pharmaceutical organisations, government officials caught defying quarantine restrictions, perceived political biases in the media, and negative past experiences with health professionals (Peretti-Watel et al., 2015). Vaccine controversies can also diminish the level of trust in vaccines themselves. These could be both past, such as the now retracted article associating MMR vaccines with autism (DeStefano & Shimabukuro, 2019), as well as relatively recent, such as fears over AstraZeneca COVID-19 vaccines causing blood clots ("Blood clots very rare", Times of Malta, 2021), although the latter did not appear to have had a significant impact on the Maltese vaccination rollout (Cuschieri, 2021).

2.2.3 Risk perception and risk society

The role of vaccines in controlling and eradicating disease has made them one of the greatest achievements in public health (Koppaka, 2011). Nevertheless, vaccines are still be subjected to a risk assessment by individuals weighing the benefits against possible adverse events. Vaccine-related adverse events (VRAEs) can be understood as any unintended effects resulting from vaccination (He et al., 2014), ranging from pain and swelling at the injection site to anaphylaxis. Most VRAEs are mild and temporary, while severe adverse events are extremely rare; nonetheless there are several reasons why the risk of VRAEs may be perceived to be greater than the benefit gained from vaccines. Firstly, the benefits of vaccines can only be appreciated when comparing disease incidence between vaccinated and unvaccinated populations while VRAEs cause direct, negative impacts to individuals' health and social or working lives (Dubé et al., 2013). Secondly,

decreased visibility of vaccine-preventable diseases due to successful vaccination programmes may have led to people downplaying the risk of the disease, the severity of its symptoms, and the need for vaccination (Dubé et al., 2013; MacDonald, 2015). Thirdly, vaccination is irreversible while abstaining from a vaccine can be amended by taking it at a future date, which can lead to complacency and indefinite postponement of immunisation (Dubé et al., 2013). All these factors can contribute to omission bias which is a preference for risk of harm resulting from inaction (i.e., not getting vaccinated) rather than from action (i.e., taking a vaccine).

It should be noted that, unlike health experts, laypersons might not necessarily be utilising a scientifically informed, probabilistic approach to assess risk. Dubé et al. (2013) proposed that personal experiences, as well as the experiences of those in one's social circles, are the first and foremost sources of knowledge which individuals may draw upon to assess risk. However, the authors also mention a 'lay theory of immunity', a collective worldview which views vaccines as a technology which can disrupt or 'overload' the body's delicate state of homeostasis. With this logic, vaccines are shunned in favour of 'natural' methods of supplementing the immune system. Such methods may range from exercise, taking vitamins, and avoiding processed foods, as well as treatments outside the realm of conventional medicine such as complementary and alternative medicine (Dubé et al., 2013). The rejection of conventional health advice and embracing of non-evidence-based treatment may be interpreted by health experts as public ignorance which needs to be amended by disseminating information to the general populace. This is the basis of the deficit model of science communication, which assumes that filling the public's gaps in scientific knowledge will make them more agreeable to expert recommendations. While one cannot understate the importance of giving visibility to reliable health advice, this model is now

considered to be largely ineffective due to its condescending attitude towards lay knowledge which does foster trust between laypersons and experts. In other words, it is the scientific experts who need to listen to laypersons to improve communication of scientific knowledge (Lidskog & Sundqvist, 2012).

Incidentally, preoccupation with risk and conflicts between experts and laypersons are features of a 'risk society', a concept attributed to sociologists Ulrich Beck and Anthony Giddens. Risk society covers how risk is socially constructed, how society organizes itself in response to risk, and new forms of risk which emerged with technological advancements, globalisation, and industrialisation (Baxter, 2020; Lidskog & Sundqvist, 2012). Beck (1992) wrote that whereas risk in the pre-modern world was mostly related to local short-term hazards, modern risks were concerned with effects which may appear much further in the future and affect much larger populations. Applying this concept to health, risks can be influenced by individual behaviours (such as prolonged smoking causing lung cancer), medical practices (such as overuse of antibiotics leading to antibiotic-resistant bacteria), and governmental action or inaction (such as failure to curb over-reliance on private transport, contributing to atmospheric pollution). Beck (1992) continued to write on the ways in which scientific rationality may be at odds with social rationality, meaning that the scientific assessment of health risks may not be able to fully address social concerns. For example, the mortality rate of a disease does not specify which populations are most at risk of dying from it, and identifying at-risk populations does not necessarily specify what the actual risk factors are; is it behaviour, environment, economic status, or perhaps a genetic component? Furthermore, scientific rationality might not address social anxiety regarding the 'catastrophic' potential of a technology, say a new vaccine, to cause severe, irreparable damage in

the unforeseeable future, even when the chance of such an event is proven to be exceedingly rare (Beck, 1992).

2.2.4 Social groups and habitus

While vaccine acceptance or rejection is ultimately an individual decision, the role of social relationships cannot be understated. Streefland et al. (1999) drew upon several ethnographic studies to suggest the existence of local 'vaccination cultures', described as collective attitudes towards vaccines based on the community's shared experiences, prevalent beliefs on modern medicine, socio-political context, and pre-existing routine vaccination programmes. Any changes from the norm set by the local vaccine culture can be met with hesitancy, whether this be the introduction of a new vaccine, media coverage on VRAEs, or even simply changes in vaccination venue and medical staff. However, these cultures are not static and can shift over time; thus, the interactions between community-members and institutions can both influence, as well as be influenced, by these cultures (Streefland et al., 1999).

Attwell et al. (2018) posited that vaccination attitudes may also be linked to health-related practices within social groups. In their study they drew upon Pierre Bourdieu's concept of habitus, a collection of behaviours and attitudes shared and embodied by a particular group. While Bourdieu originally referred to social classes as having habitus (Bourdieu, 1984, as cited in Attwell et al., 2018), Attwell et al. applied this concept to social groups bound by health-related practices and beliefs, such as rejection of biomedicine and advocating for 'natural' lifestyles. The authors also suggested that vaccine rejection can be perceived as a mark of distinction and prestige within these groups, or what Bourdieu called 'symbolic capital'. Like vaccination cultures, habitus is also subject to change; when preconceived notions on vaccines are challenged, people may experience

a ‘habitus tug’ towards alternative practices associated with groups which consider vaccine rejection to have high symbolic capital.

2.2.5 Previous vaccinations

In a qualitative study on vaccine hesitancy in French parents, Peretti-Watel et al. (2019) noted that parents would go to great lengths to research the vaccines given to their children by taking advice from their peers, surfing the internet for information, and consulting multiple health professionals. However, this was mostly the case for the first child, with parents becoming more accepting when vaccinating their subsequent children even when doubts persist. The authors referred to this trend as ‘vaccine inertia’, positing that accepting vaccination in the past may increase the likelihood of accepting a vaccine in the future. There may be several reasons why this could be the case, including submission to social pressure, wanting to avoid future regrets, and streamlining the vaccination decision-making process. This trend was also noted in a systematic review and two local studies which noted a correlation between having previously taken an influenza vaccine and being willing to get vaccinated for COVID-19 (Al-Amer, 2022; Cordina et al., 2021; Cuschieri & Grech, 2021). It should be mentioned that one of the Maltese studies was carried out on healthcare professionals who presumably have a higher level of health literacy compared to the general populace, so such a result would perhaps come as no surprise.

2.2.6 Medical conspiracy theories

The pandemic has been the subject of several conspiracy theories purporting to reveal the ‘truth’ about the virus and COVID-19 vaccines. Examples of such theories include the claim that governments are using vaccines to implant microchips inside their citizens, that the virus was deliberately manufactured as a bioweapon, and that the whole pandemic has been orchestrated by

world leaders attempting to seize control of the global economy (Goodman & Carmichael, 2020; Pertwee et al., 2022). There is no universal definition for conspiracy theories, but they usually share a number of characteristics. Firstly, they allege that powerful groups or institutions are secretly exerting control on society or are involved in covering up the truth about certain events. Secondly, while the theory itself may appear bizarre, it is usually buttressed by extensive rationalisations and arguments, which makes disproving them a frustratingly difficult task (Nefes & Romero-Reche, 2020; van Prooijen & Douglas, 2018). Thirdly, they are usually associated with misinformation and, in the case of COVID-19, increased vaccine hesitancy (Freeman et al., 2022; Pertwee et al., 2022). Lastly, believers of conspiracy theories view attempts to debunk their beliefs as suppression of the 'real' truth, attributing the widespread acceptance of the mainstream narrative to the success of the cover-up story and to the gullibility of the public (Clarke, 2002; Rosenbaum, 2021).

People who espouse conspiracy theories are generally stigmatised by others as their views diverge radically from mainstream opinion (Nefes & Romero-Reche, 2020). This is corroborated by Freeman & Bentall (2017) who associated belief in conspiracies with having weaker social networks, as well as by Douglas et al. (2017) who added that social isolation, apart from being a result of conspiratorial beliefs, can also be a predisposing factor towards adopting them.

Framing conspiracy theories as problems stemming from misinformation is not completely inaccurate, but rather reductive. At an individual level, conspiracy beliefs can fulfil psychological needs, which according to Douglas et al. (2017) can be epistemic (the need be knowledgeable), existential (the need to be in control of one's own life), and social (the need for self-validation and

to feel distinct from others). At a societal level, Pertwee et al. (2022) suggested that conspiratorial beliefs can be expressions of the public's anxiety in the face of uncertainty.

2.2.7 The COVID-19 context

People in favour of immunisation may still be apprehensive towards a particular vaccine due to specific contexts related to the vaccine in question. With regards to COVID-19, Al-Amer et al. (2022) conducted a systematic review on vaccine hesitancy in the first year of the pandemic which identified several factors which affected vaccination intent. A significant cause for concern was the speed by which the vaccines was developed compared to previous vaccines as it raised questions on the rigour of the clinical trials involved. This in turn cast doubts on the vaccine's safety and the duration of its effectiveness, along with uncertainty about their long-term effects. Health misinformation and belief in conspiracy theories were also associated with increased hesitancy, with social media being singled out as one of the most accessible sources of negative media coverage on COVID-19 vaccines. On the other hand, the health threats posed by the virus, as well as fear of dying from COVID-19, may have contributed to higher levels of acceptance in high risk populations such as healthcare workers, the elderly, and people with chronic conditions (Al-Amer et al., 2022). While these factors do not pertain specifically to the Maltese context, the local context has undoubtedly been influenced by international happenings. What can be said is that in Malta there was outright demand for vaccines at some points; following the vaccination of healthcare professionals at the start of the rollout, various economic sectors such as finance, retail, education, and security all clamoured to have their personnel next in line for the jab (Abela, 2021). However, this enthusiasm appears to have dwindled as the pandemic drew on with public discontent over vaccine certificates, a document needed for travel and access to most

establishments. Furthermore, taking additional booster shots was required to update this certificate as it would otherwise be considered invalid. This led to a public protest in the streets of Valletta, Malta's capital city, in January 2022 in which hundreds of people participated (Arena, 2022).

Interestingly there have also been accounts of COVID-19 vaccine hesitancy related to religious convictions. This is not unprecedented in the history of vaccines, as some religious factions view vaccination as supplanting the natural order of illness and healing (Dubé et al., 2013). For some, COVID-19 vaccines were morally objectionable due to the use of foetal cell lines for their testing and development (Runwal, 2021), necessitating the Vatican to state that in the absence of alternatives such vaccines were considered morally acceptable by the Roman Catholic Church (Glatz, 2020).

2.3 Vaccine Hesitancy Models

The wide variety of complex and interacting factors outlined so far, as well as the ambiguity surrounding the very definition of vaccine hesitancy makes it challenging to establish a theoretical framework for this phenomenon. In a 2014 paper, the WHO suggested using the following two vaccine hesitancy which categorise and group the aforementioned factors together. The first model is the 3Cs model, a simplistic but straightforward framework which posits that hesitancy depends on the interaction between Complacency (lack of vaccination initiative due to a perceived low risk of disease), Convenience (access to vaccines), and Confidence (trust in vaccines, healthcare institutions, and policy-makers). The second model is the Working Group Matrix model which is more complex as it considers many other factors, categorising them as contextual, individual or group influences, and vaccine specific (WHO, 2014). Some of these factors, mostly pertaining to the first two categories, are particularly helpful in understanding vaccination cultures. These

factors include anti- or pro-vaccine lobbying, politics and policies, community members' experience with vaccines, and socio-cultural norms regarding vaccination.

The SAGE working group definition (mentioned at the start of the chapter) utilised yet another model, called the Continuum Model of Vaccine Hesitancy. This model places vaccine-related behaviour on a spectrum with complete acceptance and high vaccine demand on one end (pro-vaccination), and refusal of all vaccines on the other (anti-vaccination). Anything between these two extremes is classified as vaccine hesitancy (MacDonald, 2015). While the model can help give a general understanding of hesitancy, it is limited when trying to accurately plot individual profiles. The continuum model was also criticised as it implied that anyone between the two ends of the spectrum is undecided on whether they are pro- or anti-vaccination (Peretti-Watel et al., 2015).

The following example can help one's understanding of the limits of the continuum model; Person A actively accepts and campaigns for vaccination in general but refuses COVID-19 vaccines due to doubts on the rigour of their trials, while Person B usually does not get vaccinated out of complacency but seeks COVID-19 vaccines due to fear of the disease. Both their behaviours are similar in that they both accept certain vaccines and not others. However, it is unclear how these two profiles would be placed on the continuum - is Person A more hesitant due to their refusal to get vaccinated, even though they may self-identify more strongly with the pro-vaccine label than Person B?

To address this issue, Peretti-Watel et al. (2015) proposed an alternative two-dimensional framework which can be visualised as a scatter diagram with trust in institutions on one axis and commitment to 'risk culture' on the other. Trust in institutions is taken to indicate conformity with vaccination programmes and greater acceptance. Risk culture considers the structural and

institutional aspects of modern society which lead individuals to take responsibility for their present and future health (Giddens & Pierson, 1998). According to this framework, people who show greater commitment to risk culture are more 'rational', in the sense that they make greater efforts to inform themselves about vaccine-related risks through research and discussions with medical professionals. Under this framework, profiles are given two labels, being accepting or hesitant and rationalist or passive. For example, the seasonal influenza vaccine is likely to be sought by 'passive acceptors' who are accustomed to yearly vaccinations, whereas novel or controversial vaccines might be more likely to be accepted by 'rational acceptors' and rejected by the 'rational hesitant'. These examples also illustrate how this framework can be used not only to plot individuals' general vaccination attitudes, but also attitudes towards specific vaccines.

Nevertheless, there does not seem to be any consensus on a universal framework for vaccine hesitancy. Dubé et al. (2013) refer to several other individual studies which identify specific categories of vaccine-hesitant parents, such as 'advocates', 'believers', 'cautious', 'late vaccinators' and 'rejecters' (Benin et al., 2006; Gust et al., 2005; Keane et al., 2005). These terms further support the notion that vaccine hesitancy is a nuanced phenomenon which is difficult to strictly categorise.

2.4 The Internet and Social Media

2.4.1 Access to information and misinformation

The late 20th century brought significant changes in the way health is perceived and how healthcare ought to be delivered. The rise of health consumerism, expert patients, preventative healthcare, and the shift towards patient-centred care have empowered patients to become more involved in health decision-making (Madden & Sim, 2016; Prior, 2003). This also meant that some of the

responsibility to maintain good health was transferred from healthcare professionals onto patients themselves who were now expected to adopt healthy lifestyles and protect themselves against future health risks. Thus, people were now subjected to conflicting, paradoxical messages; on one hand they were encouraged to take individual responsibility for their health while at the same time being exhorted to place their complete trust in health professionals. In navigating this social-medical landscape, the internet was instrumental in providing accessible medical knowledge to laypersons, helping them make informed medical decisions.

'Virtuality' and 'cyberspace' are terms used frequently when describing the internet, as if the internet exists in a separate dimension disembodied from reality. However, when viewing it through a sociological lens, the internet is both an extension as well as a part of the lived experience of countless people around the world and "a kind of social laboratory or even liberation in which the performative character of all social realities and identities can be brought to light, deconstructed and transcended" (Miller & Slater, 2000, p.5). Thus, the internet is simultaneously a technology, a method of self-expression, an area of research, and a global venue in which smaller communities are nested.

Another quality of the internet is that it is a vast repository of knowledge which anyone with an internet connection can access, modify, and contribute to. Thus, the production and consumption of online knowledge has been democratised to a certain extent. This however presents two problems; firstly, the lack of online gatekeeping, which was vital for this democratisation, allows for unreliable information to be published and spread online (Chou et al., 2021). Secondly, the internet allows for laypersons to access expert information without having the necessary background knowledge to understand its theoretical underpinnings (Mnookin, 2011). The COVID-

19 pandemic has also demonstrated another issue with online information; the sheer quantity of content and information about COVID-19 can cause 'vaccine fatigue' (Su et al., 2022), which is complacency to get vaccinated due to desensitisation. This has been thought to contribute to the overall decline in intent to get vaccinated throughout 2020 in certain countries despite the rising number of COVID-19 cases (Al-Amer et al., 2022). Indeed, the WHO acknowledged that we are currently living through an unprecedented 'infodemic' facilitated in great part by the internet and social media. Their statement goes on to advocate for dissemination of evidence-based data to combat misinformation (WHO, 2020); however due to ongoing research, emerging virus variants, and changing expectations of vaccines, this implies a constant stream of new information, which can further contribute to vaccine fatigue.

Increased dependency on the internet for vaccine-related information has been thought to be a cause of hesitancy, as suggested by Betsch et al. (2010) who correlated parents' exposure to anti-vaccination websites to decreased willingness to vaccinate children. This perception is evidenced by the many online public health campaigns which attempt to correct misinformation and debunk conspiracy theories by disseminating reliable information (Chou et al., 2021; Dubé et al., 2013; Tustin et al., 2018). However, others warned that such strategies are not always effective, and that a causal relationship between online misinformation and vaccine hesitancy is difficult to establish (Dubé et al., 2013; Tustin et al., 2018).

2.4.2 Social media

Along with the internet, use of social media has become ubiquitous in modern societies. Social media platforms allow their users to freely interact, communicate, and share personal experiences and online content, connecting them in ways which were previously impossible and strengthening

pre-existing ties. Social media users may also perceive these platforms as sources of news and health information which are more reliable than traditional media (Lewandowski et al., 2012). However, Baccarella et al. (2018) warned that these same characteristics of social media can have undesired, albeit unintentional, effects. Sharing content allows for the spread of misinformation, participation in online groups may trap users in echo chambers, and the anonymity that certain platforms permit enables malicious users to provoke or manipulate others without fear of repercussions.

Social media blurs the line between virtual and 'real', offline life, and indeed nowadays these terms cannot be considered mutually exclusive. A clear example is Miller & Venkatraman's (2018) study on Facebook users in England and India. In the English participants, a wide variety of interaction 'categories' could be linked to users' different social groups; these included secondary-school children communicating with their best friends, young adults interacting with colleagues, parents soliciting advice from each other, and complete strangers connecting through mutual interests. They also found that in their Indian participants, gender and socioeconomic class were the main factors influencing Facebook use, such as lower-class Indian women being restricted to communicating only with family members, due to male relatives policing the females' Facebook activity. In both countries, the participants' top interactors shed light on the users' values and reasons for using social media, whether it is to extend close relationships into the online world, to stay connected with valued persons who are difficult to meet offline, or to express passion about their personal interests.

The literature relating vaccine hesitancy with social media mostly framed these platforms as sites where people can be exposed to anti-vaccination content, which breeds hesitancy. Anti-vaccination

rumours and narratives on social media may could be linked to increased vaccine hesitancy in pro-vaccine individuals (Ward et al., 2017, as cited in Pertwee et al., 2022), while anti-vaccination content has been found to have a greater reach than pro-vaccine content (Johnson et al., 2020) and to be able to resist attacks on its credibility (Warner & Neville-Shepard, 2014; Zollo et al., 2017). Indeed, attempts to debunk or parody anti-vaccination content may have the opposite effect; Cascini et al. (2022) proposed that aggressive attempts to devalue anti-vaccinators on Facebook and Twitter do not go down well with people who are still undecided, while Ahmed et al. (2020) found that Twitter users mocking the COVID-19 5G conspiracy theory may have been partially responsible for increasing the topic's visibility. That being said, social media use was not always linked to vaccine hesitancy. Peretti-Watel et al. (2019) posited that a substantial portion of internet-users may be shrewd enough to discern whether online information on vaccines is reliable or not, while Ahmed et al. (2018) linked using Facebook as a source of health information with being more likely to accept an influenza vaccine.

With regards to COVID-19 vaccines, Cascini et al. (2022) carried out a systematic review on the relationship between social media use and vaccination attitudes, in which they made a number of observations. Firstly, although social media use was generally associated with decreased intent to get vaccinated, sentiment towards COVID-19 vaccines varied widely, depending on the social media platform, geographical location, and significant vaccine-related events. Secondly, many concerns about COVID-19 vaccines mentioned previously were prevalent in global online discourse, furthering the view of social media as an extension of lived experiences whether they be local or international, individual or collective. Thirdly, a significant proportion, if not the majority, of vaccine-related content on social media consists of anti-vaccination messaging.

2.5 Conclusion

Vaccine hesitancy can present as a wide variety of behaviours and attitudes, and can be associated with myriad of complex, interrelated factors. The literature shows that although vaccine hesitancy is generally considered to be a health issue, the influence of social and political factors cannot be discounted. With social media, it is also evident that the way in which technology influences the way people live and interact also can have a bearing on hesitancy. Thus, all these factors need to be taken into consideration when carrying out further investigations into vaccine hesitancy.

CHAPTER 3: RESEARCH DESIGN

3.1 Research Method

The way that people share, interact with, and discuss online content on COVID-19 vaccines may indicate their attitudes towards the vaccine and how online discourses are conveyed and perceived. Using this premise, the chosen method was a qualitative, grounded, digital ethnography which allowed me to become immersed in social media to observe, document, and analyse content, interactions and discourses regarding COVID-19 vaccines.

Digital ethnography is a flexible technique which has been used by many media scholars across different disciplines in recent years, using both online and offline data collection methods. Pink et al. (2016) described a variety of approaches to this technique, three of which were deemed particularly salient to the primary research question. The first approach was using digital ethnography to study an 'event' "as a research 'window' through which we might begin to investigate processes of societal transformation" (Pink et al., 2016, p.149). Significant events in the unfolding COVID-19 'story', including events related to vaccines, have found social media to be an effective medium through which they could be shared. The second approach was to view social media itself as a 'thing', that is a digital technology with practical and symbolic significance in people's lives as opposed to an abstract, intangible concept existing in virtual reality. The third approach is to research 'social worlds'; the internet is not a monolithic online space but is inhabited by a diverse range of individuals from different walks of life. Thus, social media is a site where people from different worlds converge, allowing them to interact and to move from one online space to another, while simultaneously providing the freedom for people to form their own private online communities.

3.2 Population and Sample

Facebook was the social media platform chosen for this study, for several reasons. Firstly, it is one of the most widely used social media platforms in Malta ("Facebook remains Malta's most popular", Malta Independent, 2021). Secondly, Facebook allows for a wide range of activities and interactions on its platform. Thirdly, my own familiarity with the platform was also a deciding factor.

At this point, a few definitions are necessary. A Facebook *user* is a person who has set up a profile on Facebook, consisting of a space where the user may post content. This may take the form of written messages, images, and links to other web pages. Users can also react to, comment on, and share other content which is publicly accessible to them. A Facebook *page* is similar to a profile but is usually set up by businesses, organisations, institutions, or public figures to establish an online presence on Facebook as well as to publish their own content. Users can connect with each other (by sending and accepting friend requests), join groups (online communities within Facebook itself, usually dedicated to common interests), and follow pages. The content generated by these different sources becomes visible on each Facebook user's wall, a feature which displays a curated feed of content based on each user's interests and online activities.

The target population consisted of Facebook users and pages based in Malta. As of early 2022, the estimated number of Maltese Facebook users was between 359,900 and 485,800 ("Facebook users in Malta", 2022; Kemp, 2022), although since users can create multiple Facebook profiles, the actual number of users could be less. This population was composed of roughly equal numbers of males and females, although data on people who identify as non-binary was unavailable (Kemp, 2022). With regards to age, most active Facebook users were between their mid-twenties and mid-

forties ("Facebook users in Malta", 2022). While this information gives some idea of the demographic being studied, it should be noted that there is not enough information to determine whether these age and gender groups are representative of the Maltese population. Furthermore, from the study population only public content and active users whose activity was visible to me could be included in the study; therefore, the sample was a non-random convenience sample.

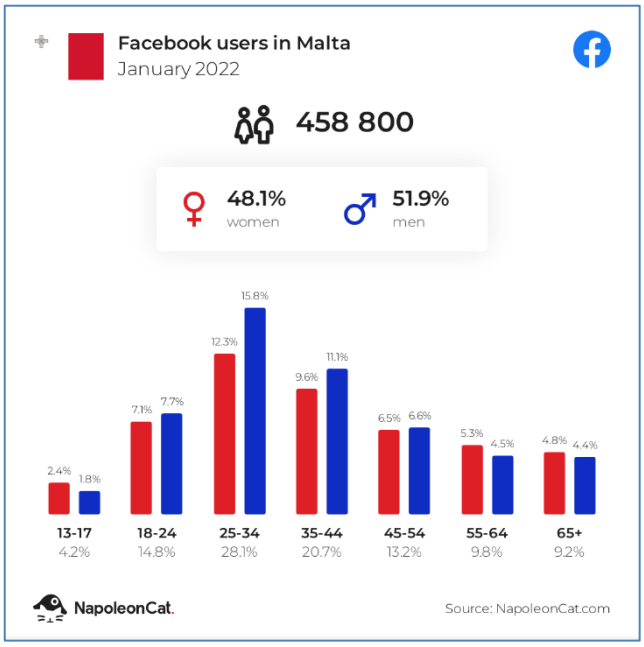

Figure 1: Demographic data on Facebook users in Malta in January 2022 ("Facebook users in Malta", 2022).

Verifying whether each Facebook user was living or based in Malta was not possible due to individual privacy settings. Furthermore, the process itself was unlikely to be fruitful due to the openness of online social circles which may span across different countries. In the case of Facebook pages, the country of origin was usually easier to confirm as in many cases they either represented known Maltese entities, produced content on Maltese current affairs, or listed a physical Maltese address in their information section. Therefore, the only exclusion criterion was pages which were clearly not locally based. This implied an assumption that people who

commented on or interacted with ‘local’ content had at least a general idea of the Maltese context vis-à-vis COVID-19 vaccines.

3.3 Fieldwork

Data collection started in March 2022 by conducting searches using the Facebook search bar. The keywords used were “COVID” and “vaccine” (or “vaċċin” in Maltese), both separately and in conjunction with each other, which were used to bring up Facebook content which was publicly available to me. The search results sidebar featured filters which were also used to search for content by date and type, allowing me to search for content related to specific local events related to the pandemic, such as the initiation of the vaccine rollout, imposition and easing of restrictions, and implementation of the vaccine certificate system. In addition to using the search bar, vaccine-related content which appeared on my Facebook wall was also included in the study. So as to broaden my search, I also followed several media houses’ Facebook pages which regularly post vaccine-related content, joined public groups and requested access to private groups which discussed COVID-19 and vaccines. Written posts, videos and the comments posted to them by other users were transcribed, translated to English, and were each classified as a *case*. In total, 26 cases were recorded, along with many other screenshots and images. The web addresses of the sampled content were also saved for future reference. During this whole process no interaction with the people posting and interacting with content was made from my end.

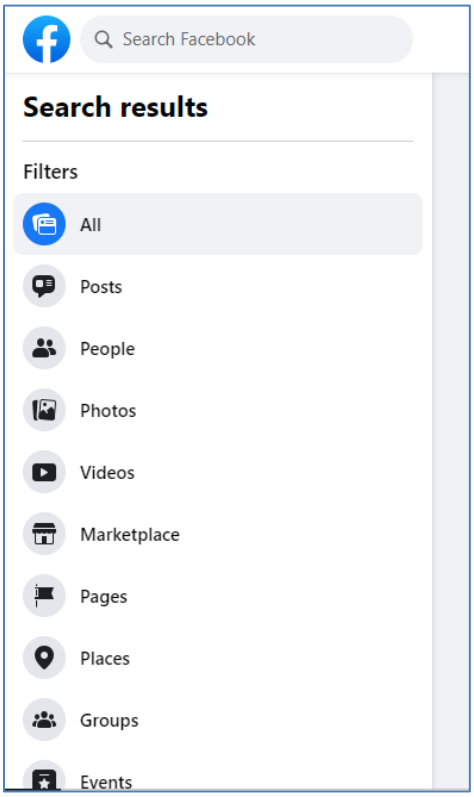

Figure 2: The Facebook search bar and filters.

3.4 Data Analysis

The data was then categorised using QDA Miner Lite v2.0.9, a qualitative data analysis computer freeware (i.e. software available at no financial cost). Each case was labelled by date, the number of reactions, comments, number of shares, content type (ex. news article, post, video etc.) and whether it was created by a Facebook user or a page. The software was then used to review and code the content, a process which was repeated at least twice. Themes were then established by identifying repetitions of thematic codes and noting similarities and differences between these occurrences in the data. This method was suitable for a mixed dataset consisting of brief textual descriptions, images, and video (Ryan & Bernard, 2003). The themes were then reviewed and re-

arranged to better represent the data and narrowed down until five distinct themes emerged, which were then analysed.

3.5 Ethical Considerations

Prior to commencing data collection ethical clearance was obtained from the University of Malta's University Research Ethics Committee (UREC). Research on social media poses a number of relatively new ethical concerns, such as whether online spaces should be considered public or private and to what extent can data be fully anonymised. The British Sociological Association guidelines on digital research note that the general consensus on social media interactions is that they are publicly viewable, and that informed consent is needed if the "research might prejudice the legitimate rights of respondents" (BSA, 2017, p.5). These same guidelines also quote the British Psychology Society as saying that exemptions from informed consent can be made where people can "reasonably expect to be observed by strangers" (BPS, 2007, p.3, as cited in BSA, 2016, p.9).

Since the content analysed was either publicly available or accessed using Facebook's features for their intended use, and since I was not to have any direct online interactions with people for the sake of the research, no harm to participants resulting from the study was anticipated and therefore informed consent was not deemed necessary for this study.

Nevertheless, to protect the identity of individual Facebook users, several measures were taken to ensure anonymity. Firstly, direct quotes were only used if they did not provide specific details which can be traced back to the individual. Secondly, pseudonyms were assigned to provide context and clarity whenever it was necessary to recount interactions between two or more people. Thirdly, names and profile pictures were blacked out in any screenshots or images presented in the

study. These measures did not apply to people featured in news articles, such as prominent public figures and social media influencers, who were mentioned by name when necessary.

All data and QDA Miner Lite files were stored in an encrypted folder on a password-protected computer, which were only accessible to myself and my supervisor. After completion of the dissertation, all data and files will be deleted.

Researcher safety was also taken into consideration in the research design. The aforementioned decision not to interact with online participants also protected myself from any possible harmful repercussions, such as harassment, online abuse and doxing (i.e. revealing private information online with malicious intent).

3.6 Study Limitations

There were some limitations inherent to the online ethnography method used in this approach. Firstly, textual data could sometimes be difficult to comprehend due to spelling mistakes, lack of punctuation, and discontinuity in some interactions between Facebook users due to edited or deleted comments. These may have led to misinterpretation of the user's original intent when commenting or posting content.

Secondly, the data which was encountered and collected would have been patterned by the Facebook algorithm which is assumed to increase the visibility of certain content over others (Newberry, 2022). The exact workings of the Facebook algorithm are unknown, which makes this algorithm unpredictable and difficult to control for (Wang et al., 2020).

Thirdly, the study sample is not representative of Facebook users based in Malta. Therefore, this study cannot be used to make definite statements on the prevalence of vaccine hesitancy on Facebook, on social media, or in the Maltese population in general.

CHAPTER 4: DATA ANALYSIS

This section will be describing the five themes which emerged from the data analysis which are science and medicine, personal experience, lay knowledge, local politics, and vaccination prestige. While these are presented as distinct themes, some overlap can still be found between themes which attests to the multifactorial nature of vaccine hesitancy.

4.1 Science and Medicine

References to science and medicine pervaded much of the discourse on Facebook, which was no surprise since vaccines can be viewed as the products of scientific research and medical expertise. Discourses regarding medical institutions, the scientific process itself, and the relevant public figures can indicate what people perceive to constitute medical authority, the validity of traditional scientific and medical authorities, and identify alternative authority figures outside traditional institutions. These insights can give a better understanding of where people place their trust on vaccine related issues, and by extension can give a clearer picture on vaccination attitudes.

4.1.1 Adopting the jargon

The language of science and medicine was used widely by users and news pages alike. This did not only include words which were already part of common parlance such as ‘virus’ and ‘antibiotic’, but also terms related to VRAEs such as ‘myocarditis’, ‘pulmonary embolism’ and ‘thrombosis’, medication such as ‘ivermectin’ and ‘hydroxychloroquine’, and vaccine-related jargon such as ‘mRNA’ and ‘spike protein’. Users appeared to rely on this language to gain the upper hand in vaccine-related arguments, which attested to the perception that adopting the language of science made one’s position more credible. For example, an online news article on conspiracy theories in the age of COVID-19 received backlash from commenters who accused the

media house of unjustly labelling anything other than the official narrative as a conspiracy theory, with one person writing:

> Is it conspiracy that most of the population will be unaffected by COVID and the IFR rate is lower under the age of 70 than influenza? (...) that 50 years of mask science pre-2020 states masks have poor efficacy? (...) that ivermectin and hydroxychloroquine have been shown to be efficacious in treating COVID? (...) that there have been 150,000 plus adverse serious reactions in Europe alone? I can go on (….)

Figure 3: Medical and scientific terms in Facebook news headlines. These articles feature 'myocarditis', 'mortality rate', 'herd immunity', and 'long Covid'.

4.1.2 Appeal for evidence

Another point was the use of research and statistics. It was commonplace to encounter people making a statement on vaccines, only to be confronted by other users asking for evidence to substantiate the claim. In a case on the Maltese Superintendent of Public Health's claim that the vaccine saved 800 lives in a year, several commenters challenged this statement: "The "claim" is supported by what? Where's her peer reviewed evidence? (...) There isn't any?". In another example a Facebook user James shared an image claiming that the American Heart Association published a paper linking mRNA vaccines to myocarditis in children, prompting another user Dean to intervene and call him out due to lack of scientific evidence:

> Dean: Can you please supply the link (…)? I'd genuinely like to read it.
>
> James: See if you can look for it on the American heart association website…
>
> Dean: I did, and no article (…) mentions such data.
>
> James: Oh well! Maybe that information is not published!
>
> Dean: [expletive] mate… If you're going to share something make sure you're able to back it up.

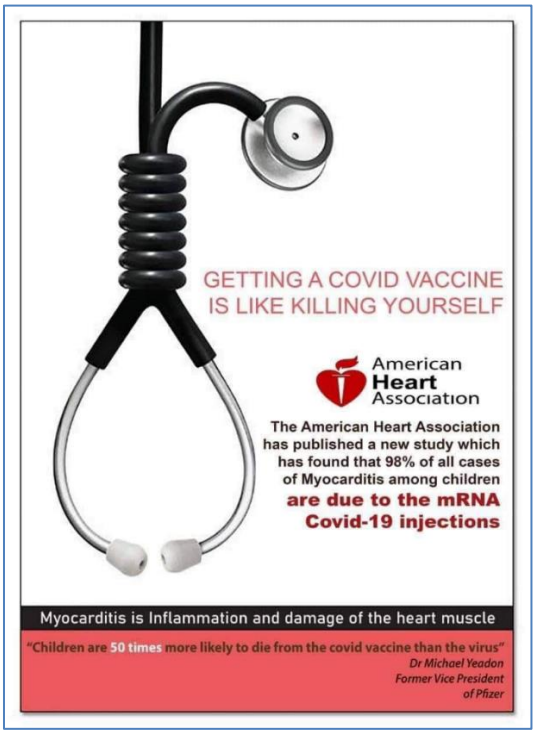

Figure 4: COVID-19 vaccines and myocarditis. This image shared on Facebook alleged that the American Heart Association discovered a causal link between mRNA vaccines and myocarditis. The powerful image of the stethoscope shaped like a noose is meant to hold the medical profession responsible for vaccine-related deaths.

4.1.3 Scientific literacy (and illiteracy)

Some Facebook users were also aware that not all scientific references were equally reliable. In one case, a user harshly criticised another who linked a pre-release article which supposedly supported the claim that COVID-19 vaccines were causing myocarditis: "Can you read English? This is not published (…) I don't trust random people on YouTube, science has its own procedures."

Varying levels of scientific literacy could be observed in the many people conflating correlation with causation, most often in discourse on VRAEs. It was common for users to attribute adverse effects to COVID-19 vaccines, even when these effects emerged after a considerable period of time: "(...) side effects are coming out at an alarming rate, and not necessarily straight after you

take the jab but even weeks and months after. (…) see how people's health is after taking these vaccines!" Another user blamed a similar experience on the vaccine, although they did acknowledge that a causal link could not be established scientifically:

> Ever since I took the vaccine and booster my immune system went down the drain (…) I have no scientific proof that these changes were caused by the vaccine but I can't deny how unhealthy I have been since getting them.

The causation-correlation fallacy was also noted in statements by commenters trying to cast doubts on the impact of the vaccine rollout on COVID-19 cases: "(...) you should be saying that [people] are not getting severely ill because the disease has become less severe, and not really because of the vaccine."

Facebook users and pages with medical or scientific backgrounds were also not immune to criticism of their scientific rigour. An example of this was 'Hekk Hu'[1], a page dedicated to disseminating reliable COVID-19 vaccine research in the Maltese language and in laypeople's terms. The name of the page itself could be seen as an affirmation of the objectivity of the knowledge and research being posted page. However, this was questioned by several users who accused the page administrators of cherry-picking studies which favoured vaccination while ignoring other equally well-designed studies with different conclusions. A user also pointed out that since not enough time had elapsed since the pandemic started, there were no studies and meta-analyses on the long-term effects of the vaccine: "(…) my argument is that we cannot say it is safe

[1] Roughly translates to 'That's How It Is'

for pregnant women, because we still don't know the effect on the child's early years. (…) you cannot rush the process."

Figure 5: 'Hekk Hu' on vaccinating pregnant women. This image speaks of the higher risk of severe COVID-19 infection in pregnant women and the benefits of vaccination for both mother and unborn child.

4.1.4 Scientific and medical authorities

Many users recognised the authority of traditional scientific and medical bodies, such as prominent Maltese doctors and researchers, health institutions, and international organisations such as the Centres for Disease Control and Prevention (CDC) and WHO. While these authority figures were often cited as reliable sources of medical expertise, others subverted these traditional authorities through ridicule, sarcasm, and by quoting other authorities whose views contradicted the mainstream stance on vaccines. For example, in a debate between two users, Charles and Alex, the traditional authority represented by Dr. Chris Barbara (a prominent Maltese pathologist) was

undermined by questioning of his credentials and by suggesting that the 'real' experts were being silenced by the media:

> Charles: …the more people take [the vaccine], the less the virus can spread. (…) How many times does the virologist Dr. Chris Barbara have to explain this? Is it possible you've never heard of him?
>
> Alex: I've listened to experts who are much more competent than Dr. Barbara. Experts that the media are trying to destroy at all costs. Experts with long years of experience in this field. People who work specifically in virology and immunity. And all of them are saying that there is something fishy.

Media coverage of well-renowned physicians recommending the vaccine was met with mixed reactions. There were many who lauded and vouched for them, exhorting other Facebook users to take heed of their advice and expertise. In this camp, knowledge of the medical field and academic achievements were factors which bolstered these physicians' authority in the eyes of Facebook users, as evidenced in comments such as "listen to this guy, not to those who don't understand", and "experts have spent years studying at university, let's listen to them". On the other hand, while a few commentors did dispute the physicians' competence, the majority of unfavourable comments appeared to be driven by unpleasant, personal experiences with the physician in question. Negative character traits, poor interpersonal skills, and expensive consultations were among the reasons named for this perception, as shown in comments such as "the less you open your mouth, the better", "you're better off listening to the patient (…) instead of shouting to ridicule the patient", and "he's too full of himself (….)." Others directly denounced physician's recommendations, calling them charlatans who promote the vaccine for financial gain, or blind to the evidence of

harm caused by the vaccine, as can be seen in this example where a senior medical doctor was sarcastically referred to as ‘Mr. Profs’:

> I’m sorry but I have to call you out as another false person Mr. Profs. (…) nothing comes out of your mouth except for deception and lies (…) Go speak to those people who lost their family or ended up with a condition (…) is it possible that nobody is concerned with the people who are suffering in silence due to the side-effects of an experimental vaccine?

With regards to the perceived trustworthiness of medical authorities, a temporal element may have also affected Facebook users’ views. For example, a Times of Malta article from December 2020 reporting on the first Maltese nurse to get vaccinated elicited mostly positive reactions and comments, praising the nurse and stating enthusiasm towards the vaccine. This contrasted with an article from January 2022 reporting a prominent respiratory consultant’s call to get vaccinated, which drew a significant proportion of deriding comments and reactions. Perhaps public sentiment at the start of the pandemic was more hopeful and eager with regards to the vaccine and as time went by the mood was soured by reports of VRAEs and lack of transparency in COVID-19 regulations and restrictions.

Figure 6: Reacting to medical authority figures, 2 years apart. Both articles feature Maltese medical professionals promoting vaccination but whereas the first article (published in 2020) received mostly positive comments and reactions, the second (published in 2022) was met with mixed reactions and derisive comments.

People in the comment sections who identified themselves as medical professionals fared even less favourably than the well-known doctors mentioned previously. These physicians mostly argued in favour of vaccination, attempting to allay fears regarding the risk and prevalence of VRAEs, but were usually confronted by users questioning their credentials and rebutting with their own personal experiences, hearsay, and taunts. Alice was one such doctor whose attempt to reassure other Facebook users was rebuffed by other users.

> Alice: I am a doctor and I can ascertain that the majority of elderly people who took the fourth dose and caught COVID did not get severely ill.
>
> Josette: …not like me then, because [the vaccine] really affected me, even my period got mixed up.
>
> Elaine: …a doctor?? And promoting the vaccine? Don't you have any shame? (…) everybody in pain and you just keep on jabbing…"

> Trev: Well done doc *[sarcastic]*. By any chance do you know any elderly people whose life was turned upside down or who died because of the booster??

The frustration experienced by doctors when faced with people refusing to accept evidence was expressed in a post advocating for physicians to address vaccine hesitancy in an understanding manner. One doctor commented "I've been called an idiot, a 'sucker', a Nazi (…) Being in Telemedicine we have also been called criminals, shouted at and verbally abused after attempting to convey the right information" while another wrote "when it comes to medicine there is no room for personal opinion. It is all about evidence-based practice. That is the reality".

So far it was noted that even when arguing for a position contrary to that of the mainstream medical authorities, Facebook users usually referenced these same authorities to appear credible, although in some cases the words quoted were misconstrued. An example of this was a person citing the WHO Director General as being against blanket-vaccination programmes to argue that the Maltese vaccination programme would weaken population immunity, even though the original quote was made in the context of global vaccine inequity. However, a minority of users directly referenced alternative medical 'authorities'; these personalities were usually former pharmaceutical industry workers and doctors who were since denounced by medical regulatory bodies for having spread misinformation on COVID-19 vaccines. These Facebook users were often quite persistent, posting the same links repeatedly in different comment sections despite being called out by other people as posting misinformation. One such user who repeatedly posted links to an interview with Andrew Wakefield (the former doctor who was central to the MMR autism controversy) repeatedly in the same thread wrote "…the entire media establishment in Malta is infiltrated. Listen to the real doctors not on their payroll", and "I'd be cautious and do my research instead of trusting the

media…". These comments suggested that for some users, alternative medical authority figures who were outside the traditional establishment were the ones speaking truth and were being silenced for it. Interestingly, it was also noted that almost all of these 'alternative' authorities were foreign; perhaps due to the suspicion that Maltese doctors were being pressured by the local health institutions to remain silent on VRAEs, a foreign physician may appear more reliable. As one person wrote on Maltese physicians, "…many doctors KNOW what can happen but they don't write a [vaccine] exemption for you… as if they are being threatened by someone".

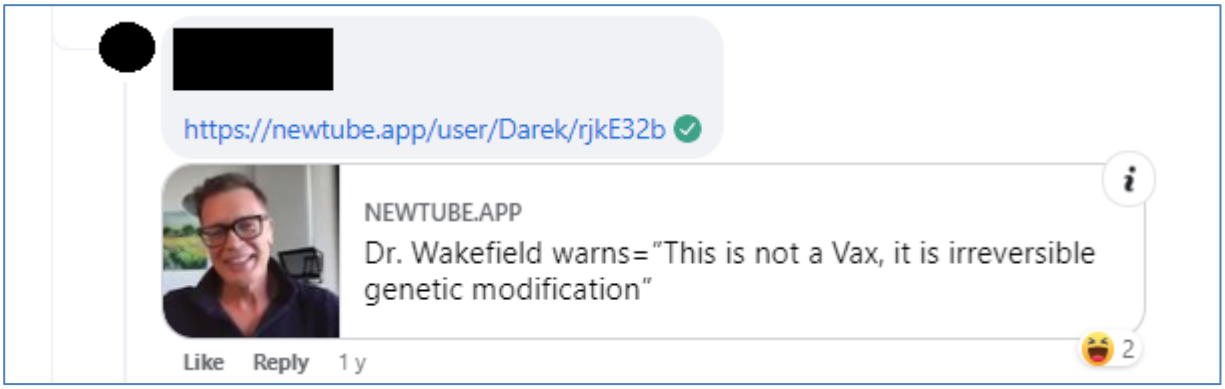

Figure 7: An interview with Dr. Wakefield. On a news article promoting COVID-19 vaccines, one person in the comments section posted this interview with prominent anti-vax campaigner Dr. Andrew Wakefield several times.

4.1.5 Good science, bad science

When science and medicine were invoked in these online discourses, there seemed to be an underlying thread between even the most diametrically opposed opinions on vaccines; simply put 'good' science, or rather 'good' scientific practices, produces 'good' vaccines. What constitutes good science however appeared to depend on one's preconceptions of the scientific process, scientific literacy, trust towards traditional institutions, and experiences with medical professionals. Facebook users manifested their ideas of what constitutes scientific authority as support for their chosen authority figures and subversion of the figures which deviated from the individual's scientific standards. Thus, it seemed that vaccine hesitancy was associated with

perceiving traditional medical authority figures to be straying away from the individual's notions of good scientific practice, resulting in users to speak out against these authorities and attributing scientific authority to figures outside traditional institutions.

4.2 Personal Experience

Facebook was used extensively by users to share personal experiences with COVID-19 vaccines. These anecdotes were mostly seen in the comments sections of articles posted by media houses' Facebook pages and vaccine-related posts by doctors, politicians, and other well-known public figures. The majority of these comments, often written using emotive language, recounted negative experiences with vaccines and attracted large number of supportive comments and reactions, producing a corpus of experiential knowledge which contradicted and challenged the scientific consensus on the vaccines' safety and efficacy. These stories were also often accompanied by declarations of not being willing to take any more vaccines in the future, a direct expression of vaccine hesitancy following a negative experience with the vaccine.

4.2.1 VRAEs – loss of self, loss of loved ones

Among the most frequent complaints were those pertaining to VRAEs; these included a variety of symptoms ranging from mild to severe, including pain at the injection site, lethargy, tinnitus, dizziness, chest pain, and arrythmia. Many people were sharing their experiences with VRAEs, naming and comparing the different vaccine brands, and detailing any medical interventions needed as a result. Some of these accounts came with great levels of detail, such as this example of a user's experience with the Moderna booster vaccine:

> (…) after 15 minutes I was feeling hyper (…) I went to the supermarket, then went home to wash the clothes and clean the kitchen. I took the

> booster at 2.00pm, finished doing my kitchen at 6.00pm, had a wash, and put on the TV around 8.00pm. (…) around 4.00am, I wake up with headache, pain in my bones, my hand I couldn't lift it up, dizzy, etc. so I called my daughter and she gave me 2 panadols. After a minute, I was vomiting, so bye bye panadols. (…) the colour of my face was yellow and green. Anyway I couldn't have any pain killers, as I was vomiting, and yes the pain was too much (…) I spent two days in bed. Then I started to get better. A month passed, still I am tired, and sometimes I feel pain in my bones. (…) I am afraid to have another booster (…).

Another account similarly details the user's experience with VRAEs and subsequent hospital admission, this time after taking the Astra Zeneca vaccine:

> (…) I was paralyzed for 12 days (…). My doctor prescribed me catafast (…), had a fever of 104 F which lasted for 36 days! I was hospitalised (…) they did me hundreds of blood tests, heart echo, ultrasounds, x-rays, 2 CT scans and then a PET scan (…). Doctors told me it was either lymphoma or a vaccine reaction. (…) took me 6 months to recover (…).

Like this account, several other people also recounted how, similar to long COVID, the effects of the vaccine could be felt long after they took the jab. While this was described only as a temporary setback by some, others lamented that their life was never the same after vaccination with many referring to their 'past' and 'present' selves. For example, one woman claimed that her 'past self' used to jog 4 kilometres daily, a pleasure she was unable to enjoy since taking the vaccine due to body pains and fatigue. Another user similarly reported aching in his bones which started after getting vaccinated and hadn't been resolved since, explicitly stating that after taking the vaccine "you end up getting [expletive]". Several women on Facebook blamed the vaccine for irregularities in their menstrual cycle, with one commenting that "until last year I knew how my body

functioned, however after the vaccine I lost all control (…).” These accounts implied that people who experienced VRAEs felt that the COVID-19 vaccine disrupted their understanding of and control over their own body and that they consequently lost a part of themselves in the process.

Apart from their own personal experiences, many people shared the experiences of suffering endured by their family and friends. Some of these stories could be especially intense:

> I watched my mother deteriorate until she died as soon as she took the 2nd dose which was why I didn't want to take it myself, let alone give it to my children. (…) my mother was as strong as an ox (…) They took her life and destroyed the life of both me and my family. (…) So in our case where there was death in the family, do we need to take [the vaccine] by force? (…) How dare they order us what to do after having spent 3 months of suffering?

These personal accounts were also used to contradict the mainstream narrative about unvaccinated people being at risk of severe COVID-19 infections. This comment was posted in response to an article featuring a Maltese doctor describing how his unvaccinated patients were succumbing to COVID-19:

> My (…) brother-in-law got thrombosis after the first vaccine, and he never caught COVID. [Another family member] caught COVID in Feb 2021, spent 2 weeks in quarantine and all was well. In October 2021 he took the Pfizer vaccine (…) and it almost killed him. He ended up (…) with severe chest pain due to an inflamed artery in the heart and at hospital they told him it was due to the vaccine. Now he's contemplating suicide.

The general response towards these stories was generally agreeable, with people acknowledging that they had already heard others who went through the same ordeals, or that their own

experiences matched exactly with what was written. Also, while these cases were presumably a statistical minority, it is possible that these online stories could be considered to have the same weight, if not more, than the scientific information also being circulated on Facebook. This aspect was highlighted in a heated exchange between Alice (a doctor) and Michael, another user:

> Michael: (…) Myself and many other Maltese like me know that the vaccine has caused more harm than good!! Now the majority have opened their eyes (…)
>
> Alice: And how do you know this? Have you carried out a scientific study?
>
> Michael: Because I live in this world, speak to many people, and I have common sense, and even though you're a doctor, you're not going to fool us, neither me nor the 75% of Maltese because we're not idiots. Do you understand??

4.2.2 Devaluing positive experiences

Some positive experiences with the vaccine could be found, but these were not numerous, nor did they attract the same amount of Facebook activity as they were either ignored, 'liked' only by a few people, or opposed. One woman wrote how after the second dose she experienced blood clots in her period but took the third dose anyway and experienced no adverse effects. In another thread of comments, Reuben's positive experience was downplayed by others:

> Reuben: I just cannot understand how people refuse to take booster shots… I had 4 shots… I tested positive for COVID but had very mild symptoms… only a few sniffles and fatigue… It was all over in 3 days. (…) Then I did a PCR COVID test after 7 days and tested negative.
>
> Alex: I took none and never had COVID. The secret is to eat healthy and nothing else.

> Fran: Interesting. I have an unvaxxed friend who tests weekly for work – 13 tests to date and she never had [COVID-19].
>
> Clint: You had a cold, but okay let's call it something else…

Perhaps a reason why this sort of discourse did not attract the same response as the negative experiences is that when vaccination goes well, it is quite an unremarkable experience. The protection conferred by vaccines cannot be immediately felt, as opposed to the expected mild side-effects; even using the word 'positive' to describe it feels somewhat inadequate.

It was also noted that people who were vulnerable to COVID-19 due to a chronic illness spoke strongly of a 'positive' experience resulting from vaccination. Such people, such as George and Gillian in this example, defended the vaccine rollout and supported COVID-19 restrictions, claiming that these measures were safeguarding people like themselves from severe illness and death.

> George: I am a vulnerable person (…) I might not be still alive (…) the vaccines protected us (…)
>
> Gillian: My daughter was highly positive while [my husband] and I were boosted and it was no problem at all... and my immune system is already weakened because of the chemo and injections I've had to take.

4.2.3 Adam Ben – debating vaccine exemptions

Tying in with VRAEs, exemption from COVID vaccines was also a hotly contested issue on Facebook. With vaccine certificates becoming necessary to travel and have access to public establishments, people who suffered severe VRAEs sought to bypass the vaccine by applying for medical exemptions. However, this study did not find anyone claiming to have been given such an

exemption; on the contrary, many were reporting being met with rejection or non-response by the authorities, even in what they described as ‘genuine’ cases.

Discourse on medical exemptions was observed mainly as a response to a viral video posted by a fitness instructor, named Adam Ben, appealing to the Superintendent of Public Health to grant him an exemption after suffering from a flare-up of Meniere’s disease after taking his first dose. He alleged that the reason why he and many other genuine cases were being denied an exemption was due to political pressure to boost Malta’s vaccination rate: “(…) lest we put the vaccine in a bad light, lest we aren’t named ‘most vaccinated country in Europe’ (…)”. Adam claimed that as a result, people were being forced to choose between safeguarding their health and maintaining their social freedom. He also criticised the Public Health department’s lack of transparency with regards to the scientific basis of their exemption criteria, noting that in any case population studies should not be used to dismiss exceptional cases of people who experienced lasting harm from the vaccine.

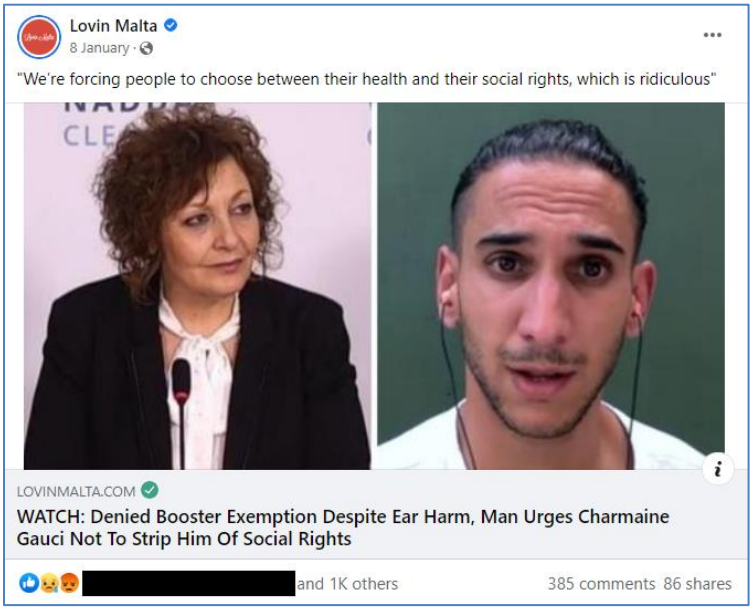

Figure 8: Prof. Charmaine Gauci (left) and Adam Ben (right). Adam’s appeal for a medical exemption sparked numerous debates on VRAEs, politics, and risk.

The sentiment in this video was shared by many people, with many posting messages of support, thanks, and praise at Adam's bravery to speak out against the Maltese authorities. One user commented that he felt he was being "treated like a criminal" for refusing the vaccine. Another user who was refused an exemption despite being hospitalised following a VRAE shared her own account, corroborating Adam's story: "(…) I've been 10 months fighting for an exemption!! But instead I have been given a 2nd dose appointment under observation!!! This is ridiculous (…)".

There were some who disagreed with Adam and could be broadly divided into three categories. The first category consisted of people accusing Adam of inciting fear of the vaccine in the public, with comments such as, "You are doing more harm than good! (…) you are coming up with an excuse, not a valid reason, so as not to take the vaccine and trying to fool others into doing the same!". This sort of comment was generally not received well by most others who viewed it as a case of 'punching down' at the victim of the story. Adam himself explicitly stated that he was not against the COVID vaccine per se, which also put some doubt on the scaremongering narrative. The second category were people who, while agreeing that health authorities should take VRAEs seriously, argued that in these cases the vaccine should still be taken, as the health risks associated with being unvaccinated outweigh any VRAEs: "better the vaccine side effects than the full effects of the virus (…)". The third category consisted of people arguing that it was unethical of the government to force the public to take an 'experimental' vaccine, risking severe and potentially fatal VRAEs, in order to maintain their social freedom. This viewpoint was summed up succinctly by this comment, "why should I be harmed to be exempted? This should be a choice." By this logic Adam's campaign to receive a medical exemption was seen as playing into the hands of the authorities' unlawful attempts to coerce people into getting vaccinated. "Nobody should need an

exemption. This mandate is illegal. You're legitimising it by fighting for an exemption", wrote one user, while another commented, "(…) having to 'ask' for an 'exemption' is unethical and stupid. (…) doing so gives power to criminals who keep oppressing [us] with unethical and immoral rules."

Adam's story also opened up a discussion on VRAE risk and people's different perceptions of risk. Vaccine-acceptance did not exclude awareness of the potential risk of VRAEs, and this was alluded to by the second category of people who expressed their disagreement with Adam. In fact, people from this camp who wrote in favour of the vaccine still said that the decision to vaccinate should be taken after a "benefit-risk assessment". However, what was a risk-assessment for some was considered a gamble for others, as pointed out by this comment: "both the effects of COVID and the vaccine are a gamble, and you are telling him to take a chance on the one thing he knows for sure triggers his health problems?"

4.2.4 Exploring experiences within a Facebook group

All of the negative feedback and experiences mentioned so far could be summed up in a public Facebook group named 'Illness, wounded, handicaps, deaths, and discrimination due to the vaccine'. According to the group's description, it was created specifically for Maltese people to share their own VRAEs in order to create an online collection of such cases. Many people did just that, but there were also other posts soliciting advice on travel restrictions, political propaganda advising against voting for the political parties which supported vaccination, memes, articles on foreign cases of VRAEs, and recruitment of volunteers to spread awareness on the dangers of vaccines. There were also a number of posts about people who died unexpectedly, implying that the vaccine has caused a rise in premature deaths since its introduction in Malta. This claim needed

to be taken at face value, since no context was provided which confirms or refutes this proposition. It was also noted that all the discourse which could be observed in this group was unidimensional, being categorically against the vaccine. This was not a place for a nuanced discussion, as suggested by an administrator's post thanking members who alerted him to people speaking out of line so that they could be blocked from the group.

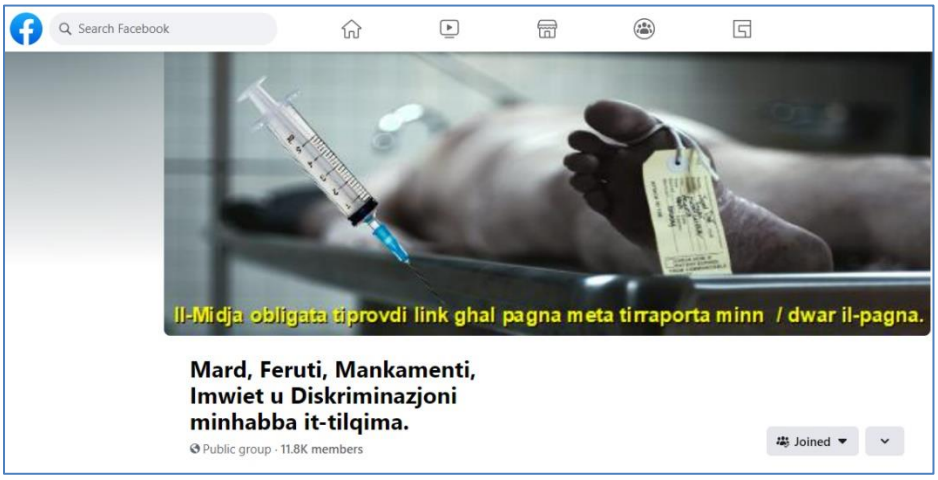

Figure 9: An anti-vax echo chamber. This Facebook group, named 'Illness, wounded, handicaps, deaths, and discrimination due to the vaccine', was set up for people to share their experiences with VRAEs,. The caption in the cover photo states that the media is obliged to provide a link to the group if they report from or about the group.

Interestingly, the group description also encouraged members to write in Maltese, ostensibly to avoid detection and censoring by Facebook, demonstrating the administrators' distrust of the same platform on which their own group was hosted. It was also noted that words like 'COVID' and 'booster' were censored or deliberately mis-spelled by the administrators for this same reason. Distrust in Facebook was also seen in group members who complained of Facebook's fact-checking feature which prevented them from sharing content with misleading COVID information. This suggested that these kinds of measures taken by social media platforms may limit the spread of misinformation but do little to educate users on what constitutes reliable information. Instead,

that same information could still be shared as a comment or image without a link to the original website, which makes it more difficult to scrutinise the source material.

Figure 10: '6 die while positive for COVID'. This screenshot from a local news website was shared in a Facebook group. The commenter, allegedly the sister of one of the victims, claimed that her brother died due to negligence at his nursing home. Note that 'COVID' has been redacted by the group administrator to avoid detection by Facebook.

4.3 Lay Knowledge

Discussions, posts, and responses to vaccine-related online content on Facebook were seen as windows into laypeople's understanding of vaccines. This lay knowledge formed the basis of lay theories, which could be described as collective ideas shared between many people who are not medical experts based on their level of scientific literacy, personal opinions, and past experiences. Even though lay theories may be numerous, varied, contradictory, or lacking scientific basis, these

theories were still worth investigating due to their influence on vaccination attitudes and choices. Thus, this section will analyse these ideas, how they may contribute to hesitancy, and how they diverge significantly from the general scientific consensus on vaccines as safe, effective, and instrumental in controlling the pandemic.

It should be noted that there was no way to unequivocally determine whether people on Facebook were laypersons or experts. While some Maltese public figures and scientists were renowned and respected, most of the discourses analysed were posted by strangers whose credentials were unknown or by self-proclaimed experts whose authenticity could not be verified. However, the following observations gave me a reasonable level of confidence that the discourses in this section constitute lay knowledge, such as the fact that most of the discourse diverged radically from the scientific consensus. These discourses also did not make an appeal to the scientific method or research, as could have been expected from an expert who disagrees with the scientific consensus. Furthermore, views which were congruent with the scientific consensus could still be part of vaccine lay knowledge, making it irrelevant to a Facebook user as to whether the view was posted by a layperson or an expert who did not identify themselves as such.

4.3.1 Lay theory of vaccines

One way by which lay theories were deduced was by analysing the multitude of views on COVID-19 vaccine efficacy. It should be noted that even the existence of so many diverging opinions in the public, mainstream media, and the scientific community itself gave an appearance of inconsistency which contrasted with the idea of science as a source of factual knowledge. This could cast doubt on public health messages and science communicators, as was the case with one Facebook user identifying himself as ‘pro-vax’, who commented on an article about YouTube

banning anti-vaccination videos from its platform: “What about the fake claims from ALL mainstream media 9 months ago? (…) ‘get vaccinated’, ‘it stops transmission’, ‘herd immunity’, ‘we eradicate COVID’… That was not fake news?” It could also be interpreted as a case of shifting goalposts, presumably by ‘scientists’ or ‘politicians’, which could be summed up in this analogy:

> (…) imagine if the greatest scientist comes and tells me that if I take a gulp of sea water I won't get sick, and I do it. And I get sick (…) then he says, 'you see? But you didn't die. Now take two because one might not be effective any more’. And I take two gulps of seawater. And we get sick again and he says once again ‘well done, can't you see it worked? Now take three and you won't get sick, and if you get sick you won't die and you won't spread it’. I'd tell him Mr. Profs *tal-bigilla*[2], why don't you take the three gulps of seawater and leave me in peace?

Looking at specific ideas in the vaccine efficacy debate, a fundamental disagreement seemed to be how vaccines’ protective effect was expected to manifest, whether by granting complete immunity to COVID-19, reducing the risk of infection, or simply diminishing the severity of symptoms. All these expectations could be in turn undermined by comments made by vaccinated individuals complaining that they tested positive for COVID-19 or contracted a symptomatic case of the infection. Furthermore, many people noted that symptomatic COVID-19 cases were still on the rise despite vaccine uptake.

> Eric: I know people who took the booster and after a few weeks came out positive, so boosted and unvaccinated people are the same.

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[2] Bigilla is a traditional Maltese broad bean paste. In this context, the user could be implying that the scientist is a cheap, ‘home-grown’ product of the Maltese educational system.

> Joe: Almost all of Malta is vaccinated, cases exploded upwards, people are dying, so one still needs to be careful with the booster or without it.

At times disagreements were not due to clashes between different expectations, but rather different interpretations of the same observations. For example, the argument that vaccines reduce rather than eliminate the risk of infection was used both by people expressing vaccine hesitancy and vaccine acceptance.

> Franco (hesitant): Vaccines supposedly lower the risk, not cancel it. In fact the Influenza vaccine's efficacy is about 40% (…) many get sick and have adverse effects after taking it.
>
> Jeremy (accepting): Vaccines are not 100% effective, but they provide a much lower risk of contracting the infection.

Another source of debate on vaccine effectiveness was whether vaccines affect virus transmission. An important part of the media and political rhetoric in Malta was that vaccination was an altruistic act which reduces the chance of infecting others aside from protecting the vaccinated person. This question was hotly debated in the comments section of a news article quoting Prof. Stephen Montfort, a respiratory consultant, as saying “We need to take the booster to protect those around us”. This claim was contradicted by many people alleging to have caught COVID-19 from vaccinated individuals. Furthermore, the Maltese government’s continued imposition of social restrictions despite widespread vaccine uptake was also taken as evidence of vaccines’ inability to curb the spread of COVID-19. This conflict between vaccines’ expected outcome and their perceived effects on transmission was expressed as frustration in comments such as “you take the vaccine but you can still catch and spread the virus (…). The only benefit is not to have serious symptoms (…) so you’re just protecting yourself, idiot!” Others took it even further, suggesting

that vaccinated people were less likely to be symptomatic and would inadvertently increase virus transmission: “You’re still not going to protect the ones around you because you won't know you're sick... you'll actually be spreading it more.”

In addition to perceived vaccine efficacy, apprehension towards vaccines could also reflect lay theories. A primary source of this apprehension was fear of VRAEs which was frequently and strongly expressed on Facebook despite the relative rarity of serious adverse effects. Responding to the aforementioned article featuring Prof. Montfort, one user commented “How many boosters do you want us to take? Until I suffer from thrombosis?” Commenting on another person’s experience of feeling sick following the vaccine, another user directly attributed his own vaccine hesitancy to the stories he heard about other people’s VRAEs: “I’m sorry this happened to you missus, I didn’t take anything because I am afraid of this vaccine due to its effects on some people like you.” So numerous were the reports and stories on VRAEs that in some instances the vaccine was even described as ‘poison’ or as an ‘experimental drug of unknown contents’. Furthermore, people expressed their apprehension of VRAEs with a future vaccination, despite an uneventful first vaccination experience.

COVID-19 vaccine apprehension was also due in part to the differences in their development process and mechanism of action compared to preceding vaccines. The relatively quick production and distribution of vaccines contributed to the perception that they were in the experimental stage. An article reporting on the start of the Maltese vaccine rollout was met with comments claiming that the some stages of the vaccine trials were disregarded, and that “you can’t trust a rushed vaccine”. Others expressed disbelief on how the vaccines were developed so soon after the pandemic’s onset whereas a cure for cancer has not been found after decades of research. Taking

a vaccine was also described as playing Russian roulette, “some will be fine, some will die, and many are injured”. This was also the reason why at the start of the Maltese vaccine rollout a commentor suggested that frontliners should not be the first to get vaccinated:

> Please do not give the vaccine to the front line workers first. If something goes wrong we’re all [expletive]!!! Give it to the politicians first as if we lose a couple […] nobody would even notice. […] frontline workers should not be the guinea pigs…

This idea that people receiving the vaccine are ‘guinea pigs’ was also based on the use of mRNA technology which could have been a novel concept for laypersons. “There is a difference between an mrna jab and the usual vaccine shots we took as kids. And yet people have been led to believe that they are the same (…)” wrote a user in another post.

In some cases, fear of vaccines was heightened to such an extent that people said they would prefer catching COVID-19 rather than risk taking a vaccine. Given the disease’s high recovery rate and asymptomatic or mild presentation in most cases, VRAEs could have been viewed as an unnecessary risk despite the vaccine’s possible benefits. There were also people who claimed to prefer a ‘natural’ death from COVID-19 rather than living with a permanent vaccine-related disability. This sentiment could on one hand reflect an aversion towards ‘artificial’ medical technology and a high value given to quality of life but could also be an underestimation (or ignorance) of the longstanding impairments resulting from long COVID. These are a few responses which represent these points of view, taken from news articles featuring health professionals encouraging the public to get vaccinated:

> James: (…) there is a recovery rate of 99.8% (…). I'll take my chances with Covid (…).
>
> Carl: If my destiny is to die of COVID, I'll die of it no problem, you have to die of something. Better than being [expletive] for life.
>
> Mark: From what I heard after the vaccine many people spent a couple of days feeling very ill... and with omicron many people don't even realise they had it.
>
> Gabriel: You're sending people to the grave with these fff.... injections (…). If I have to die, let me die, otherwise let me be.

Lay theories of vaccines could also be influenced or affirmed by authority figures on Facebook. One such figure was Donatello Pisani, a pharmacist turned fitness coach with a sizeable online following, who portrayed vaccines as part of a process of overmedicalisation of everyday life. In one of his videos, he warned that medicines are often being prescribed to mask the symptoms of unhealthy modern lifestyles rather than to improve health and wellbeing. While the video was not on COVID-19 vaccines per se, he did use vaccines as an example while reciting a hypothetical exchange between a patient and their doctor:

> 'Doc, the vaccine has really messed me up. I'm really unwell, what can I do?' 'Don't worry, let me give you these medicines: one for the pain, one to help you sleep, and one to calm you down, and you'll be better in no time.'

Most commenters on this video agreed with him, thanking him for his insights and his bravery to speak out against the medical establishment. Several commenters took his line of reasoning further, speculating that pills and vaccines could be responsible for the emergence of conditions such as

ADHD and autism, and accusing pharmaceutical companies of creating a dependence on medicinal drugs.

Figure 11: Donatello on camera. This video, in which he criticised the overmedicalisation of daily life, led me to investigate deeper into Donatello's content and views regarding COVID-19 vaccines

This video prompted further examination of the content that Dontaello shared on Facebook through his profile and pages in the past. He was found to have uploaded a plethora of videos in which he combatively expressed his views on Maltese society's overreliance on pharmacological management of chronic conditions instead of exercise and healthy nutrition. He had also posted numerous images vociferously criticising society's exaggerated fear of COVID-19, vaccine mandates, and social restrictions. These images were usually snippets from newspaper articles and scientific journals accompanied by a short, strongly worded caption. Both his videos and images enjoyed a considerable number of positive reactions, supportive comments and shares, but his videos had a significantly greater reach, garnering tens of thousands of views. Such content could

have had a far-reaching impact on people's views on vaccines, highlighting the relationship between influential authority figures and lay theories on vaccines.

Figure 12: A selection of Donatello's content. In these images he shared snippets of foreign news articles which supported his views that COVID-19 vaccines were unnecessary and ineffective, and that there exists an agenda which promotes vaccines and silences those who question the mainstream vaccine narrative.

4.3.2 Lay theory of immunity

The term ‘immunity’ featured frequently in this ethnography, which was unsurprising since it is a core concept in the rationale for vaccines. Although it is linked closely to lay theories of vaccines, observing

Thus, while this section builds on the previous one, lay knowledge of immunity could gauge the public’s deeper understanding of the fundamental concepts which justify the creation and use of vaccines. This in turn calls attention to how laypeople’s views on immunity can bear on vaccine hesitancy.

One of the prominent viewpoints on immunity was that it is a system which can be fortified in various ways, of which vaccines are but one. Methods which did not rely on pharmacological products and vaccines were seen as more desirable by some, while others viewed vaccines as effective adjuncts, despite not advocating strongly in their favour. People who strongly attributed their COVID-19 immunity to vaccines usually also reported being vulnerable or immunosuppressed. These various attitudes were represented in the following Facebook comments:

> Robby: Strengthen your immunity with exercise, a balanced diet and an active lifestyle, not with injections and pills.
>
> Charles: Yes, [strengthen your immunity] with vaccines as well. You're not going to lose anything by taking a vaccine like the many you had as a child.
>
> Annemarie: Just take the booster (…). If it was not for the vaccine my partner would be dead, he had COVID and nothing happened to him… he

> has COPD [a chronic respiratory condition] … doctor told me if he gets COVID he will die. The vaccine surely protected him.

There were also several references to ‘natural immunity’, a form of immunity distinct from that conferred by vaccines. It was claimed that natural immunity is strengthened through healthy lifestyle choices and vitamin or mineral supplements. Natural immunity was also seen as superior to vaccine-conferred immunity in terms of duration of effect, efficacy against COVID-19 variants, and safety. People referring to natural immunity were usually more critical of health experts and institutions for neglecting this alternative viewpoint, with some alluding to ulterior motives behind vaccine-promotion.

> Courtney: (…) natural immunity is better because it recognises the whole virus and not the spike of one mutation!
>
> James: (…) I have missed many vaccines and I haven’t gotten sick myself (…) most of the population have vitamin deficiencies because some idiots who are supposedly experts always said that one orange is enough. They should be ashamed for not telling people that they need to take vitamin C and D and zinc, just so they can promote the vaccine.
>
> Chris: It's rare to hear a Prime Minister or Health Minister advocating to eat healthy and take vitamins. It’s all about covid covid covid and vaccine vaccine vaccine.

Acquiring a COVID-19 infection was cited as another way to strengthen natural immunity by letting nature run its course and allow the body to create its own antibodies in response to the virus. Indeed, antibodies were viewed as valid markers of immunity, sparking debates on whether the government should use antibody levels to justify vaccine exemptions. The line of reasoning for this argument was that it should not matter if antibody production results from a vaccine or an

infection as there should be immunity to COVID-19 either way. Therefore, the insistence on vaccinating all populations, including those with high antibody counts, appeared unreasonable to many and created doubts on the intentions behind the institutions promoting vaccines. This issue was brought up by Alan in the comments section of a public post discussing the upcoming booster shots, where it was also noted that his concerns were not addressed by the explanation provided by Charles:

> Alan: I've tested for antibodies. I have more than enough. So why do they want me to get vaccinated again? (…) Can you explain this frenzy to vaccinate everyone?
>
> Charles: Your immunity is going to decrease over time. Obviously (…) the more people take it, the less the virus can spread.
>
> Alan: Right now I am immune to the virus, so why are they going to take my rights?

Finally, there were those who claimed that COVID-19 vaccines negatively impacted immunity instead of strengthening it. Some hypothesised that vaccinations weakened the immune system and increased people's dependency on vaccines, making them more susceptible to disease. However, at times it was not clear if 'weakened immunity' in these contexts was referring to a state of poor health post-vaccination, rather than increased susceptibility to disease. For example, on Adam Ben's post (mentioned in a previous section) there were several commentors attributing Adam's incident to a case of diminished immunity resulting from the jab, even though it was a clear-cut VRAE. On another news article reporting increasing COVID-19 cases, it was suggested that people with 'weakened immune systems' post-vaccination were instead being labelled as

suffering from long COVID. Perhaps ‘immunity’ may have become a byword for a state of general physical wellness, a deviation from the biomedical definition of the term.

4.4 Local Politics

Most of the Facebook content analysed so far debated the scientific and medical merits of COVID-19 vaccines, however vaccines were far more than simply a health issue. The rhetoric, actions, and decisions of politicians played a significant part in how the ordinary citizen would be affected by COVID-19 and vaccines. Furthermore, the extent to which the actions of the Maltese government aligned or diverged from the public’s perception of scientific authority would also determine the perceived trustworthiness of local politicians. This section will therefore be discussing how Facebook content was able to cast a light on how the intersection between vaccines, social life, and politics could contribute to vaccine hesitancy.

4.4.1 Vaccine certificates – protection or discrimination?

The majority of Facebook content relating COVID-19 vaccines to local politics was characterised by mistrust and disillusionment with the government, contrasting with the high levels of trust enjoyed by the Maltese government prior to the pandemic (“Trust in Malta government”, Times of Malta, 2018). Many users accused the government of promoting COVID-19 vaccines for reasons other than the health of its citizens. One such motive mentioned was to maintain the country’s high vaccination rate just for the sake of upholding Malta’s appearance of being in control of the pandemic. Another was that the government was supposedly profiting off the distribution of vaccines or trying to use up all their remaining vaccines before they expired. Lastly, vaccines were also viewed as instruments of control which became even more evident with the introduction of the vaccine certificate system. While all the Maltese society was subjected to social

and economic regulations intended to curb the spread of COVID-19, vaccine certificates granted greater social freedom, access to travel, and reduced quarantine periods to people who took the full course, including the booster shot. Since it was already established that people may have been vaccine hesitant due to past experiences, fear of VRAEs, or 'science-based' convictions, the unvaccinated and partially vaccinated may have genuinely felt wronged by the Maltese authorities. For them, vaccines may have become a symbol of discrimination by the political class which should have been safeguarding the interests of minorities.

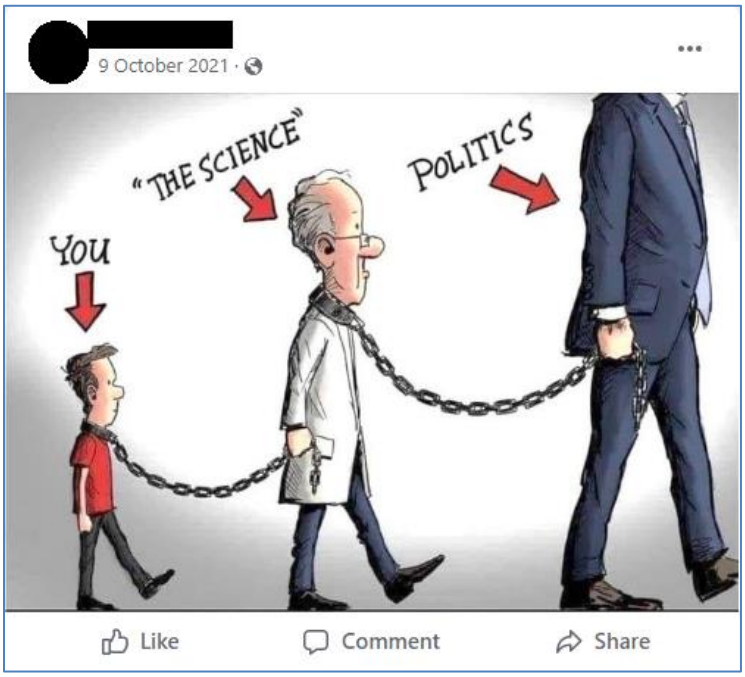

Figure 13: "The Science" following politics. A satirical cartoon shared on Facebook acts as a commentary on how laypersons follow science which they perceive to be objective and impartial, when in reality scientific practices are being influenced by political affairs.

The use of vaccine certificates to limit the movement of unvaccinated populations was based on the premise that being vaccinated reduces virus transmission. This was already being debated, as noted in a previous section, but even if this premise were to be universally accepted there remained the argument that such a measure went against democratic values, with one commenter equating

forced vaccination to “abuse of power and tyranny”. This discrimination against unvaccinated people was also being compared to practices typical to fascist regimes; for example, a user commented on Adam Ben’s story with “taking away my rights because I didn't get vaccinated is the same as Nazis who would imprison and torture you if you were Jewish”. On his page, Donatello Pisani uploaded a photo of a sign outside a local council building denying service to anyone without a vaccine certificate, prompting a user to comment “do they want to give us the [Jewish] star as well?”

Figure 14: Discrimination at the Valletta local council. Donatello’s take on COVID-19 restrictions based on vaccination status, writing ‘Those who discriminate should be ashamed of themselves. We are one people. I will never discriminate’.

Not everyone agreed with this view, and indeed the idea that vaccine certificates were a violation of democratic rights was sometimes belittled by pro-vaccine individuals on the grounds that vaccines were never made mandatory. However, the consequences of not having a vaccine

certificate were significant enough to make it appear that this choice was only an illusion, as was noted in this exchange:

> Josianne: Over 2/3 of Malta (…) has been vaccinated, of their own choice.
>
> Martin: “their own choice” – really?
>
> Josianne: Nobody tied them to a chair and vaccinated them, so they went of their own choice. I certainly did, as did all my family.
>
> Martin: The choice you speak of is to take the booster or be denied a life.

Another argument from the pro-vaccine camp was that vaccination was a social responsibility which surpassed the individual’s freedom of choice and that wilfully unvaccinated people should not be eligible for healthcare if they become seriously ill from COVID-19. However, this argument was criticised as a case of double standards, since our healthcare system does not discriminate against people with diseases resulting from unhealthy lifestyle choices.

> Matthew: This is not about "freedom of choice" or "human rights", this is just a selfish privilege (…): you can afford refusing the vaccine just because you have a public healthcare system.
>
> Amy: Well said. I wonder how many of those refusing to get vaccinated would be willing to sign a contract [to be] denied hospitalization for covid.
>
> Lee: [denied] hospitalisation when all of us pay taxes? Once they start denying obese people, chainsmokers, drug users, people who partake in dangerous activities by choice etc then I'll sign the contract (...)

4.4.2 Political protagonists

While it was usually the ‘government’ or ‘ministry’ being cited as being behind the alleged vaccination scheme, there were frequent references to Chris Fearne and Charmaine Gauci, the

Health Minister and Public Health Superintendent respectively, who could be considered as protagonists in the Maltese COVID-19 scene. These two were speculated either to be the secret beneficiaries of the vaccination rollout, or to be against the government's alleged wrongdoing but were silenced into cooperation. While these versions of events ascribe different intentions to the two public figures, they similarly imply that citizens are being taken advantage of by their governing institutions. Jason and Marlene, both commenting on Adam Ben's news story, expressed these points of view in their comments:

> Jason: After hearing [about Adam Ben's story]... should you keep trusting Charmaine and Chris with closed eyes? Everyday I confirm your diabolical plan.
>
> Marlene: This [the government profiting off vaccines] is happening 100%. Who knows whether Charmaine and Fearne are being constrained against their will.

While Gauci and Fearne both started out as fairly popular pro-vaccine figures in the initial stages of the pandemic, some changes in public perception were noted as time went by. Fearne, having already been a familiar face in Maltese politics, retained plenty of vocal Facebook supporters, despite the occasional negative comments levied against him. These were especially noticeable in response to the lifting of government restrictions and reports of the WHO praising his handling of the pandemic, with people writing their thanks and describing him as 'champion' and 'king'. Contrastingly, Gauci's popular appeal appeared to wane as the pandemic drew on, with comments about her most frequently describing her as a 'charlatan' or a 'puppet' of the government. Even when giving good news, such as supporting the abolition of mandatory public mask-wearing or

reporting the positive impact of vaccines on COVID-19 mortality, she was still accused of making unsubstantiated claims.

On the topic of political figures, the opposition party leader Bernard Grech was also featured heavily in one of the cases examined, despite not having a strong overall presence in the discourses analysed. This was a Facebook news article on the opposition party's stance against the vaccine certificate scheme, possibly one of its only major disagreements with the ruling party on COVID-19 matters. Once again, opinions were largely divided between viewing Grech as a champion for democratic rights ("Thank you Bernard. Freedom of choice [and] democracy must win."), or as a politician attempting to curry favour with the anti-vax crowd ahead of the upcoming general election ("Grech saw a crowd of potential voters and changed his stand. (…) the Nationalist Party cannot be trusted."). As with the previous examples mentioned, both interpretations suggest that vaccines can also be socially constructed as tools for political gain, and that science, biomedicine, and lay knowledge are not the only contributors to vaccine hesitancy.

4.5 Vaccination Prestige

In previous sections it could already be noted that many online disagreements on vaccines were characterised by attempts at disparaging and condemning people with different opinions and a resistance to consider alternative points of view. At the same time, there appeared to be a tendency for people to attribute positive or negative connotations to particular vaccination decisions and opinions. This prompted an investigation on whether vaccination status could be associated with social 'prestige' or a sense of superiority over others, as this could give further insight into vaccine acceptance, hesitancy, and rejection.

There were instances in which Facebook could be compared to a battleground of opinions where supporters and detractors of COVID-19 vaccines fought for supremacy. Name-calling and ad hominem attacks were common, both during interactions between Facebook users as well as in individual posts and comments, as exemplified in this exchange between two men arguing whether medical professionals were to be trusted on vaccine issues:

> Trevor: Well done to those idiots who think they know more medicine than a professor, including these people using laugh emojis. Your ego is bigger than your brain.
>
> Charles: (…) ignorant are those who don't believe their own eyes but instead believe those who are making a profit. You are the essence of ignorance.

People in favour of vaccines tended to infer their superiority from siding with the medical establishment or by demonstrating their grasp of vaccine science. For example, in a debate on what constitutes medical authority, a pro-vaccine user quipped that "those [anti-vaxxer] idiots think they know more than a professor of medicine", while in a separate discussion on virus variants another user wished that "people would open their eyes" to the fact that "as long as there are countries with low vaccination rates, there will be new variants." On the other hand, people who spoke against vaccines distinguished themselves by their defiance towards those in power who were promoting vaccines and by claiming to see the ulterior motives behind the mainstream version of events. Some commentors set themselves apart from the vaccine 'herd mentality', with one user stating "I was always my own shepherd". In another case where it was announced that facemask restrictions were being eased for vaccinated people, an unvaccinated Facebook user commented that instead

of being angry or feeling pressured to get vaccinated, he would continue wearing his mask with pride to show off his vaccination status.

There were also some instances where people objecting to vaccines recognised and interacted with one another, supporting each other in comments sections and bonded over their shared 'prestige'. For example, in the comment section of an article on the fourth booster dose, Edgar struck up a conversation with Roxanne who was unwilling to get vaccinated, calling her "a real queen" and advising her to stay mindful of governments who were "using fear to brainwash the gullible". In another thread, a user wrote that his "eyes are wide open" after having been fooled into taking the first two doses, with another user encouraging him to "stay strong".

Interestingly, there were many people expressing their reservations on vaccines who explicitly stated that they did not identify as 'anti-vax', stating that the issue was not vaccines themselves but rather the way in which they were being imposed. One user, a medical doctor who frequently wrote in favour of COVID-19 vaccines, wrote a post acknowledging that 'anti-vax' as a label was used "too loosely and [was] vastly unhelpful", preferring to use the label for people who were not amenable to rational, evidence-based discussion.

Practically nobody used the anti-vax label to describe themselves, with some opting for 'pro-choice' and in one case a user identified himself as 'pro-vax' even though he did not intend to get vaccinated, writing "My body my choice. Those who took the vaccine, that's your choice. (…) that's why I said I am pro-vax, I believe those who want it can take it." Similarly, the term 'conspiracy theorist' was also a label which nobody wanted to be associated with, with people opposed to vaccines pointing out that the term was being used to dismiss controversial arguments unfairly. There were some who complained that "the fastest way to discredit a person (…) is to

label them as conspiracy theorists." This kind of reasoning was also evident in comments on Adam Ben's story, such as people being "ridiculed, made fun of and labelled conspiracy theorist" when trying to warn others of VRAEs. In another case, a user who was an outspoken proponent of the New World Order conspiracy theory, complained of being labelled as a conspiracy theorist in order to discredit him and felt vindicated when the vaccine certificate system confirmed his suspicions that global governments were slowly taking over the world.

The unwillingness of vaccine hesitant individuals to be associated with the anti-vax and conspiracy theory crowds was also seen in an interesting interaction on a news article announcing the fourth booster. In the following exchange, Arthur alluded to the 'common cause' shared by many people who opposed vaccines for different reasons, but reprimanded Stefan for his language which could be off-putting.

> Mark: They can take the 4th vaccine themselves. No more!!
>
> Stefan: Even the 3rd, 2nd and 1st were unneeded... *beeeq beeeq*[3].
>
> Arthur: Stefan, comments like that do not help our cause. Help people open their eyes yes, but this comment pushes people away more than anything.
>
> Stefan: Beeeq Beeq.
>
> Arthur: You idiot, I am also against this madness!

Here Stefan was also indirectly comparing vaccinated individuals to sheep, insinuating that they were blind, docile followers of the authorities. This was probably a reference to 'sheeple', a

[3] An onomatopoeia for the cry of a sheep, equivalent to 'baa' in English.

portmanteau of ‘sheep’ and ‘people’ used frequently by conspiracy theorists, which could further explain Arthur’s distaste for Stefan’s choice of words.

CHAPTER 5: DISCUSSION AND CONCLUDING REMARKS

> "Scientific knowledge is a body of statements of varying degrees of certainty - some most unsure, some nearly sure, none absolutely certain."
> – Richard P. Feynman, *The Pleasure of Finding Things Out*

This study sets out to investigate how vaccine hesitancy may be produced in the context of Facebook and to provide insights on how this hesitancy may be displayed, generated, disseminated, or assuaged on social media. The analysis of the data could be summed up in four overarching points which collectively address the primary research question and individually answer each research sub-question.

5.1 Constructing and Subverting Authority

The first sub-question inquired on how scientific and medical authorities are perceived on Facebook, how they are invoked in online discourse, and where do people believe that this authority lies. This study showed that even on Facebook where the voices of public figures and internet celebrities can have a large impact on public opinion, people considered scientific authorities as reliable sources of valid information on COVID-19 vaccines. This could be due to the perception that scientific facts are an objective reality existing independently from the social world, something which Latour & Woolgar (1986) disputed on the grounds that science is grounded in social practices. In any case, appealing to science could be thought to give credence to one's position, making 'science' a faction worth aligning with.

To be sure, there were differences in what constituted scientific authority to different people; for some it was the 'traditional' establishment consisting of local and international medical institutions, Maltese government, and the social actors associated with them. For others, the scientific authorities worth aligning with were figures associated with medicine who acted outside of the government's sphere of influence and were thus perceived to be able to dispute the official vaccine narrative. Finally, people on Facebook may perceive themselves to be scientific authorities, especially when carrying out online research and borrowing from medical language to support their views on Facebook.

This study also suggests that Facebook was used to subvert traditional scientific authorities in favour of alternative viewpoints, which may be negatively associated with vaccine acceptance (Dubé et al., 2016). A particularly striking example of this subversion was the belittling of doctors taking place during direct Facebook interactions. This seemingly goes against the idea that interactions with healthcare professionals are key in assuaging vaccine hesitancy (Dubé et al., 2016), but a more likely explanation could be that the clinical setting, rather than social media, could be more conducive for this to occur (Hardman et al., 2020).

5.2 Personal Fears, Social Anxieties

The second sub-question asked how scientific rationality fares when it comes face to face with people's personal experiences with COVID-19 vaccines. Negative vaccination experiences were more common by far in many of the cases analysed, highlighting people's fears of serious VRAEs and their dissatisfaction with how authorities and medical professionals reacted to these concerns. This over-representation of negative experiences may skew Facebook users' vaccination expectations, which according to the mainstream narrative would be that the majority of vaccinees

should not suffer from any serious adverse events. Furthermore, accounts of authorities ignoring people who suffered from VRAEs could also reduce trust in the institutions responsible for the vaccination programme. Another observation was that in the face of vaccine-related anxiety and accounts of personal suffering, scientifically backed statements on the vaccine's safety did little to assuage these fears, an example of the conflict between scientific and social rationality which Beck (1992) described.

5.3 The Social Construction of Hesitancy

The third sub-question frames vaccine hesitancy as a socially constructed phenomenon, asking how social life and politics contributes to hesitancy. This point should be prefaced by the suggestion that discourses downplaying the virus's mortality rate may have predated the introduction of vaccines, leading to the perception of social restrictions as unnecessary disruptions of everyday life. Therefore, while the vaccine rollout was welcomed by many as the key to return to normality, the continued imposition of restrictions would have been regarded by many others as adding insult to injury. The vaccine certificate system may have further exacerbated this situation as it indirectly forced people into submitting to government pressure and robbed them of their freedom to make health-related decisions. The system may have also been seen as an attempt by the government to bring social life and individual health choices under their scrutiny in one fell swoop. With authorities appearing condescending or oppressive, it was understandable that some people would be resistant to comply with their instructions.

Another factor which could have led to distaste towards vaccines was their inclusion in politicians' rhetoric. While it was inevitable that this would happen, it cannot be denied that this may have contributed to the view that the pandemic was being politicised for the political party's own

benefit, which could either damage trust in governing institutions or convince citizens that the primary motivations behind vaccines were political rather than medical. The impact of this rhetoric on vaccine perception could also be influenced by the politicians' reputed trustworthiness, as well as the individual's political affiliation. All these observations support the idea that while vaccines do need a strong scientific justification to be credible, they are also socially constructed in the sense that knowledge and perceptions regarding them depend on social practices and current events (Latour & Woolgar, 1986).

5.4 Unvaccinated and Proud

The final sub-question inquires on whether people's interactions on Facebook could indicate social connotations which could be attributed to different vaccine-related choices and opinions. Most people expressing their views on Facebook appeared to regard their own stance on vaccines as prestigious, which manifested as contempt for others and self-aggrandizing language. From this study, there was no evidence of any changes in opinion resulting from online Facebook interactions, which was already suggested by Cascini et al. (2022). The reasons why this could be the case are not clear; perhaps online discussions without face-to-face interaction were not conducive to constructive debates, or maybe the strain caused by the pandemic, vaccines, and restrictions had caused people to attribute blame to those who did not share the same beliefs as themselves.

Interpreting prestige using Bourdieu's work, one's vaccination status could hold symbolic capital for different groups of people (Attwell et al., 2018). However, the symbolic capital of vaccine acceptance may be linked to qualities such as valuing scientific and political authorities, which were being challenged by the uncertainties arising from VRAEs, political rhetoric, and the various

lay interpretations of vaccines and immunity. In contrast, vaccine refusal could be part of a habitus which values being distinct from the rest of society (Douglas, 2017). Thus, it could be more likely for vaccinated or pro-vax individuals to feel a habitus tug towards vaccine hesitancy or refusal, rather than for the reverse to happen.

5.5 Concluding Remarks

Studying Facebook as a public, online venue allowed for the analysis of content which can be viewed and accessed by many different people, which helped create hypotheses on how Facebook use could interact with vaccine hesitancy. There were some general trends noted with regards to Facebook use which could shed light into how people utilise this social media platform. For example, it was observed that content posted by users on their personal profiles or in Facebook groups generally received favourable feedback, irrespective of whether the content was pro or against COVID-19 vaccines. However, in the case of public content, such as articles posted by media houses' Facebook pages, pro-vaccine arguments were generally attacked or ignored, while most comments which were hesitant towards or against vaccines received positive reinforcement from others. A possible reason for this could be that people who engaged with content posted by individual Facebook users may have already been part of the poster's social circles or shared similar interests, as suggested by Miller & Venkatraman (2018). Perhaps these people may have been more likely to express their agreeance, which in turn could create a protective effect against negative comments as people who disagree would need to pit their opinion against many others.

Another observation was that interactions characterised by hesitancy and anti-vaccination sentiment constituted the vast majority of data collected, and generally received the most favourable feedback from others in terms of likes and shares. This supports the notion that social

media users may display negative content bias, which can be heightened when the content in question also makes an appeal to emotion (Jiménez et al., 2018).

To conclude, this study suggests that although Malta's initial vaccine uptake was initially interpreted to be a sign of low vaccine hesitancy (Cuschieri et al., 2021), this may have not necessarily been the case. Despite the high vaccine uptake places such as Facebook could have acted as a "semi-private social world" (Lash & Wynne, 1992, p.6) where hesitancy and resistance towards public health directives could be expressed more freely. This study also showed how Facebook was a place where scientific rationality and principles conflicted with lay knowledge and social anxieties, where people could share their animosity or support for COVID-19 vaccines based on their personal experiences, and where people can potentially connect through shared vaccination status and opinions.

The question remains whether the prevalence and impact of this hesitancy are enough to significantly affect vaccine uptake and national health in the future. While this study cannot give a definite answer, it suggests that the vaccine hesitancy on social media should not be underestimated. The suggestion that people exposed to vaccine hesitancy could become hesitant themselves is supported both by the literature (Ward et al. 2017, as cited in Pertwee et al., 2022) as well as by some accounts from this study. This is also supported by literature suggesting that people on Facebook are likely to mirror the content they are exposed to (Schroeder, 2014), further compounded by the fact that misinformation and negative vaccine messaging can have a greater Facebook reach than reliable, scientific information (Johnson et al., 2020; Sharma et al., 2017).

Another question arises from the fact that while this study could only analyse the interactions of people actively commenting and posting on Facebook, there is also a large population of passive

Facebook users who could possibly be affected by online vaccine hesitancy. This merits further study, especially since there is a correlation between people with social anxiety symptoms and passive Facebook use (Shaw et al., 2015), both of which may have been augmented by the health concerns and social restrictions related to the pandemic. Finally, viewing Facebook and other social media platforms as public venues where people share their knowledge, personal experiences, and attitudes towards healthcare institutions could be a valuable adjunctive approach to identify barriers towards public health initiatives, both during the current pandemic and in future health crises.

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