RESEARCH ARTICLE

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Exploring Attitudes of Cancer Patients Towards Vaccination in a Multiethnic Middle-Income Country: A Qualitative Inquiry

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Abstract

Background: The COVID-19 pandemic has disproportionately affected individuals with cancer, who face heightened risks and complications. While vaccination emerged as a crucial strategy to control the pandemic, concerns about vaccine safety and efficacy have contributed to vaccine hesitancy. Despite existing research, there remains a gap in understanding the attitudes of patients with cancer toward COVID-19 vaccination in multicultural, middle-income settings. This qualitative study, conducted in Malaysia, explored these attitudes, shedding light on the factors influencing vaccine acceptance within this population to inform culturally appropriate interventions. **Methods:** The participants were selected from the larger prospective study, Immune Responses and Wellbeing Following COVID-19 Vaccination in People With Cancer in Malaysia (iRESPOND@MY). A total of 12 semi-structured interviews were conducted with patients with cancer who expressed either low or high intention to receive the COVID-19 vaccine. The interviews were recorded, transcribed verbatim, and analysed thematically using NVivo V.12. **Results:** Cancer patients' attitudes towards the COVID-19 vaccination can be categorised into two primary themes. The first is a positive attitude, which encompasses perceived benefits (believing the vaccine is safe and effective), perceived vulnerability (living as a cancer patient), and cues to action (such as following government mandates and practising preventive behaviour). The second is a negative attitude, which includes perceived barriers (belief in personal immunity, fear driven by media, lack of vaccine information, and uncertainty about the vaccine. These negative attitudes were influenced by conspiracy theories, such as scepticism about vaccine development and efficacy. **Conclusion:** This study underscores the need for tailored vaccination education for cancer patients, highlighting the importance of addressing misinformation and fears to improve vaccine uptake. These findings can guide future strategies to enhance vaccine acceptance in this vulnerable population.

Keywords: Cancer patients- vaccine hesitancy- qualitative research- COVID-19 vaccination

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Introduction

Vaccine hesitancy has been recognized as one of the top 10 global health threats by the World Health Organization [1]. In order to tackle this challenge, it is crucial that health systems worldwide proactively seek to understand the factors that shape vaccine decision-making, both in the general population and high-risk populations. While vaccine uptake is expected to be influenced by perceived benefits, concerns about safety, access to reliable information and trust in healthcare systems, it is noteworthy that these influences tend to vary across different populations and sociocultural contexts [2].

Patients with cancer may encounter unique challenges related to vaccination owing to their immunocompromised state, potential interactions with cancer therapies and ambiguity surrounding vaccine efficacy and safety. These factors may exacerbate prevailing vaccine hesitancies or modify risk-benefit perceptions, rendering it essential to understand their decision-making process [3].

The introduction of COVID-19 vaccines in 2020 as such provided the opportunity to examine these factors, particularly in the context of a rapidly developed vaccine deployed during a global health crisis. Several studies have investigated the attitudes of patients with cancer toward receiving the COVID-19 vaccine, revealing insightful findings. A study among French patients with cancer for instance, indicated that 17% of the study participants had initially declined vaccination at the onset of the vaccination campaign [4]. Another study among

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predominantly vaccinated patients with cancer reported very high trust in the safety and protective efficacy of COVID-19 vaccines. However, vaccination readiness among their non-vaccinated counterparts was very low, with "fear of side effects" dominating (72.2%) [5].

Despite these insights, booster uptake and attitudes toward future vaccines remain underexplored even though they play a crucial role in protecting high-risk populations. Decision-making around booster doses may differ from initial vaccination due to evolving perceptions, personal experiences with prior doses and changing public health recommendations.

Understanding these attitudes remains relevant across diverse cultural contexts, particularly in multicultural settings where healthcare access and trust in vaccination may vary [5-7]. Beyond COVID-19, these insights are critical for informing future immunization efforts, ensuring equitable vaccine uptake and addressing vaccine hesitancy in high-risk populations. The present study sought to fill this gap by exploring both positive and negative attitudes through the lens of the Health Belief Model (HBM) [6], providing valuable insights into how perceived benefits, barriers and cues to action may influence vaccination decisions in individuals with cancer. Findings are expected to inform not only targeted interventions for high-risk populations but also broader pandemic preparedness and immunization strategies.

Materials and Methods

This qualitative study was part of the Immune Responses and Wellbeing Following COVID-19 Vaccination in People with Cancer in Malaysia (iRESPOND@MY) cohort, where participants were recruited from two tertiary hospitals in Kuala Lumpur, Malaysia: University Malaya Medical Centre (UMMC) and Hospital Kuala Lumpur (HKL), as well as from the surrounding catchment population between 2021 and 2022.

The eligibility criteria of the main study included adults aged 18 years and above who received at least two doses of the COVID-19 vaccine. Participants were either newly diagnosed with cancer or in follow-up care, encompassing a range of cancer types and stages.

For the present study, we purposively selected participants with both low and high vaccination intentions based on their willingness to receive the COVID-19 booster doses between October 2021 and May 2022. Participants who had already received or expressed a clear willingness to accept the booster were classified as having high intention, while those who declined or were uncertain were classified as having low intention. In-depth interviews were conducted using a semi-structured topic guide developed based on existing literature and expert input to explore their attitudes towards the vaccine. Due to the social distancing restrictions imposed during the COVID-19 pandemic, all interviews were conducted via video conferencing [8].

Informed consent was obtained verbally from all the participants before conducting the in-depth interviews, which were conducted in English or Malay, subject to the participant's choice. All interviews were conducted by a trained researcher. Discussions in the Malay language were translated into English, and at the end of each interview, the moderator summarised participants' opinions to ensure the key points accurately reflected their experiences and clarified any ambiguous remarks from the discussion. A standard forward and backward translation process was performed. Each interview which lasted approximately 45 minutes, was audio-recorded, transcribed verbatim, and supplemented with additional notes. Phenomenological methods were applied to ensure theoretical saturation. Data collection was continued until no new conceptual information emerged, which was achieved by the 12th interview.

Data Analysis

Audio recordings were transcribed and all the transcripts were reviewed independently at least twice by two team members. Following data familiarization, codes were generated for each of the main themes (positive attitude and negative attitude) to identify relevant subthemes. NVivo V.12 was utilized for analysis. Team members conducted ongoing comparisons, research triangulation, and consistency checks to ensure the accuracy and reliability of the coding process.

Results

Of the 12 study participants, 2 were from HKL, 2 from UMMC and 8 from the community surrounding study sites. The majority (83.3%) had received the BNT162b2 vaccine, with one patient each receiving ChAdOx1-S and CoronaVac.

Median age in the overall sample was 52 years (range: 29–71 years). Seven participants were women. Participants were predominantly Chinese (n=8), with 2 Indians and 2 Malays.

Three participants had attained up to secondary-level education, whereas the rest either had diplomas or university degrees. Five patients (41.7%) were from low-income households (earning less than RM 4,850 per month), four were from middle-income groups (RM 4,850–10,959 per month), and three were from high-income families (earning over RM 10,960 per month).

The most common cancer type was breast cancer (n=5, 41.7%), followed by lymphoma (n=3, 25%). One participant each had colon, ovarian, prostate, and chronic lymphocytic leukaemia.

Themes

Positive attitudes

Perceived benefits (vaccine is safe and effective)

Most of the participants perceived that COVID-19 vaccines are safe and effective regardless of the type of vaccine. They further justified that it is important to get a vaccine to protect themselves from COVID-19, especially because they are a vulnerable population.

"I think people want to get vaccinated because they want to be protected, just to be safe ..." (Chinese female with breast cancer)

Patients were aware that a minor risk of developing side effects or contracting COVID-19 following

vaccination persists, regardless of the vaccine. However, they largely concurred that the benefit of the COVID-19 vaccine outweighed any associated risks, which were deemed as low.

"All vaccines that we have in Malaysia, Sinovac, AZ, and Pfizer, are all effective." (Malay female with breast cancer)

"I think it brings more benefits than risks." (Indian male with lymphoma)

Perceived vulnerability (living as a cancer patient)

Participants described their concerns about vulnerability due to their underlying conditions. This was attributed to their possibility of contracting COVID-19 due to weakened immunity, as well as their potential for having COVID-19 complications that could be more severe due to their cancer diagnosis.

"I'm convinced that it (vaccine) will help fight against the virus. Because I also have cancer, so like I'm also one of the high-risk groups, and if I'm not vaccinated, maybe the effect (COVID-19) would be higher." (Indian male with lymphoma cancer)

Cues to action (following government mandatory order and engaging in preventive behavior

Some patients expressed that they needed to get vaccinated because it was a government mandate and, therefore, a social responsibility.

"It's a pandemic and not under control, so the faster we get vaccinated, and that is the only way to get out of this pandemic." (Malay female with breast cancer)

"If the government says that if you don't take the 3rd dose, you cannot go out, then you have no choice." (Indian male with lymphoma)

Patients were concordant in changing their behaviour to stay safe. It was also expressed that they practised precautionary behaviours to protect themselves and their loved ones.

"I'm still cautious, so I won't go to a place with a lot of people. Even if I just dine in, the restaurant won't be full." (Chinese male with colorectal cancer)

"You know, sometimes to a little extent, when I go outside, go to my car and I will be like "Hey, I forgot to wear a mask" and quickly go into my home to get my mask. *I'll follow SOP (standard operating procedures), and everything will be ok. The country will be protected so no worries.*" (Chinese male with prostate cancer)

Negative attitudes

Perceived barriers (belief in personal immunity, fear of media, lack of vaccine information and uncertainty of vaccine)

Believe in personal immunity

Some patients did not see the need for a vaccine to prevent COVID-19 because they were firmly rooted in their belief in 'self-immunity'.

"Because I believe whatever you take, it's your immunity. Despite being a cancer patient myself, it seems that I have proven that I have good antibodies."(Male with prostate cancer)

"I see some people can't cope with side effects, and some of them even passed away, and I believe my (own) antibody more." (Chinese female with ovarian cancer)

Misinformation from the media

Factors such as unreliable information from multiple media sources, namely social media, and the high rates of death during the peak of the COVID-19 pandemic in the country appeared to have resulted in fear and confusion, as cited by study participants.

"There is a lot of news, mostly on social media, so there are a lot of... I'm also not very sure whether it's fake news or there is a lot of death." (Chinese male with colorectal cancer)

"This is a problem. Not your problem, not my problem. It's a media problem. ... Yeah, the media created a lot of fear, so much so that people are scared when they look at it (COVID-19 vaccines)." (Chinese with prostate cancer)

Lack of vaccine information

The lack of understandable vaccine information from formal sources made participants hesitant to get vaccinated. Participants voiced their expectations from the Ministry of Health Malaysia and mainstream media to cover more reliable information on the safety and effectiveness of COVID-19 among people with cancer to persuade them to get vaccinated.

"I don't know if I want to take a booster or not because I have cancer, and I don't know whether it's advisable to take the booster, and I don't know what is in the papers la." (Chinese male with colorectal cancer)

Doubts on vaccine effectiveness

Some patients doubted the effectiveness of the vaccine, and they firmly expressed that it was unnecessary to get booster doses since they believed they had enough protection from the 1st and 2nd doses of the vaccine. Some also appeared cynical that individuals can still be infected with COVID-19 despite being vaccinated against it.

"Even if you get your second dose, you still can get COVID-19." (Chinese Male with colorectal cancer)

"Enough of protection. Enough of protection means you will not get affected by COVID, is it? I don't think so. You will still get COVID." (Malay male with lymphoma)

Perceived severity (fear of vaccine harm and vaccine-induced lymph node changes)

Fear of vaccine harm

Some participants believed vaccines could be harmful to cancer patients influenced by conspiracy theories and doubts about the vaccines' rapid development and effectiveness. These individuals worried that the vaccines could interact negatively with their cancer treatment or worsen their health, seeing vaccination as a potential risk rather than a protective measure.

"I've heard of people who mentioned that they did not want to have foreign substances." (Female with breast cancer)

"I don't believe in the vaccine, actually, and I'm afraid to get a third dose. I am living with cancer, and I won't be alive for very long, so meanwhile I am alive, I don't want

to get affected by the vaccine and COVID-19." (Chinese female with ovarian cancer)

"Many people are highly skeptical, questioning how a vaccine could be developed in just a year, which seems quite unbelievable. As the saying goes, people feel like 'white mice,' just taking the vaccine and waiting to see what happens, with no clear understanding of its effects. Ultimately, it feels as though we are still being treated as subjects in an experiment" (Chinese male with colorectal cancer)

One of the patients expressed concern over the 'lymph node inflammation' at the injection site that she experienced post-vaccination, worrying that the vaccine had 'triggered a cancer recurrence'. However, in this case, the inflammation was acknowledged by the physician as a known side effect of the vaccine rather than an indication of cancer progression

" I did my last PET scan in September, early September. I got the results in late September, and yeah, I finally got metabolic remission from the PET scan. The only finding they found was where they had injected the vaccine. I think about my left arm. Yeah, the lymph node was slightly inflamed, I think based on the PET report, but they have acknowledged that it could be due to the vaccination. So yeah, I think 'cause I did the scan less than one month after post second dose of vaccination." (Chinese male with lymphoma cancer)

Discussion

Key Drivers of Vaccine Acceptance and Hesitancy

This study explored attitudes toward COVID-19 vaccination among individuals with cancer in a multiethnic setting, revealing both acceptance and hesitancy. As expected in a hospital-based setting, most participants expressed positive attitudes toward vaccination, where trust in healthcare providers and frequent clinical encounters may have reinforced these views apart from awareness of their heightened vulnerability. External influences such as government mandates also appeared to be important cues to action. These findings align with previous studies that have highlighted the role of social responsibility and policy-driven initiatives in influencing vaccine acceptance [4, 6].

Beyond overall acceptance, this study also provided in-depth insights into the negative attitudes towards COVID-19 vaccination. Findings suggest that concerns about vaccine safety, breakthrough infections and vaccine efficacy, as well as vaccine-related (mis)information, are the main barriers that contribute to COVID-19 vaccine hesitancy in individuals with cancer. Some participants questioned the necessity of vaccination, relying on their belief in self-immunity. This skepticism echoes the hesitancy observed in broader populations, where individuals often overestimate their natural immunity and underestimate the risks of COVID-19 [9, 10]. Furthermore, as vaccinated individuals were still contracting COVID-19, some participants expressed doubt regarding the vaccine's efficacy, which in turn implies that public health messaging may not have adequately conveyed well-established evidence, such as vaccination significantly reducing the severity of illness, hospitalization, and mortality, even if it does not completely prevent infection. Taken together, these findings underscore the importance of addressing misconceptions and providing accurate information to combat vaccine hesitancy using culturally appropriate narratives. Going forward, customized messaging that emphasizes real-world data on vaccine efficacy in preventing serious illness rather than just infection prevention may help boost vaccine confidence, not only for COVID-19 but also for future immunization programs. Also, involving trusted medical professionals in vaccine conversations can strengthen these points and increase patient confidence in immunization efforts beyond the COVID-19 context.

Role of Misinformation and Communication Gaps

Fear driven by misinformation, especially from social media, was another barrier. Participants expressed concerns about the reliability of the information available and the sensationalized reporting of COVID-19-related deaths. This finding highlights the widespread impact of misinformation on vaccine hesitancy, as studies have highlighted the detrimental effects on public health efforts [11, 12]. The spread of inaccurate information further complicates patients' decision-making, underscoring the need to address misconceptions through evidence-based sources.

Additionally, the lack of comprehensive and reliable information from formal sources about vaccine safety and efficacy appeared to further fuel hesitancy among cancer patients. Participants expected more detailed coverage from health authorities to build trust. While not always explicitly stated, their concerns and discussions suggested an underlying need for more personalized information that addressed the unique vulnerabilities and specific informational needs of individuals with cancer, rather than generic messaging intended for the overall population. This need for transparent and accurate communication has been echoed in other studies [13], which highlight that clear, consistent information from trusted sources is crucial in addressing vaccine hesitancy.

Here, it is strongly felt that health authorities and wider health systems should adopt a more proactive approach to digital communication to effectively counter misinformation and serve as a consistent, trusted source of accurate information. While traditional media and some social media platforms are being commonly utilized, it is important to be cognizant that messaging may still not necessarily reach younger or more digitally engaged populations, who often frequent emerging and rapidly evolving platforms. Expanding outreach across widely used digital spaces and investing in the training of healthcare professionals to communicate effectively and engagingly, while also ensuring accuracy and professionalism, is essential. A strategic, evidence-based approach to digital engagement can enhance public trust, improve health literacy and mitigate vaccine hesitancy.

Participants also expressed major concerns about potential vaccine-related changes, such as alterations in lymph nodes, which appeared to be influenced by

conspiracy theories. Here, culturally tailored reassurance will be key to addressing vaccine concerns among individuals with cancer, as it involves adapting vaccine-related messages to align with their specific beliefs, values, and experiences with the health system. Such initiatives, for instance, may include engaging oncology specialists and cancer support groups as trusted sources, using language that acknowledges the unique concerns of patients, and addressing fears related to vaccine interactions with cancer treatments [12, 13].

Implications for Public Health Practice

While this study is rooted in COVID-19 vaccination and individuals with cancer, the findings may have broader relevance not only for understanding attitudes toward novel vaccines but also for other individuals with chronic diseases, who may feel left behind due to the lack of vaccine information tailored to their specific health needs. Importantly, this study emphatically drives the message that a one-size-fits-all approach is ineffective in vaccine communication, as vaccine perceptions and acceptance are not only shaped by diverse sociocultural, economic, and political factors but also by individuals' health conditions. For vulnerable populations, particularly those with chronic diseases affecting immune status, their medical condition adds another layer of concern and influences their decision-making. This study highlights that individuals with cancer, as well as those with similar health conditions, expect more specific information tailored to their medical circumstances rather than generalised vaccine messaging intended for the overall population. Tailored strategies that consider local beliefs, trust in healthcare systems and specific barriers to vaccination, including those faced by individuals with chronic conditions, are essential to improving public confidence and uptake. Therefore, implementing evidence-based approaches to combat misinformation and enhance public confidence will be very crucial in ensuring the success of vaccination efforts for emerging infectious diseases [14]. Community engagement, co-designing interventions with local stakeholders and leveraging culturally appropriate messaging can enhance the effectiveness of overall vaccine communication and support broader national priorities in mitigating vaccine hesitancy. These implications are summarised in Table 1 to support knowledge translation for policymakers and healthcare practitioners.

In conclusion, this study highlights the complex interplay of vaccine acceptance and hesitancy among individuals with cancer, shaped by perceived benefits, vulnerability, and significant barriers. While trust in healthcare providers and government mandates facilitated vaccine acceptance, concerns about safety, misinformation, and doubts about efficacy contributed to hesitancy. These findings emphasize the urgent need for tailored, evidence-based communication strategies to address vaccine concerns, build trust, and enhance vaccine confidence in high-risk populations. More broadly, these insights are relevant for future immunization programs, particularly for emerging infectious diseases and novel vaccination technologies in individuals with chronic diseases.

Author Contribution Statement

All authors contributed to the study design, data collection, analysis, and manuscript preparation.

Acknowledgements

Data Availability

The data that support the findings of this study are available from the corresponding author, NB, upon reasonable request.

Ethical Approval

The study was approved by the Medical Research Ethics Committee (NMRR-21-978-60010) and the Universiti Malaya Medical Centre (202151-10103).

Conflict of Interest

The authors report there are no competing interests to declare.

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Table 1. Key Implications for Policy and Practice. Key actionable insights to inform vaccine communication and implementation strategies for cancer patients and other high-risk groups.

Tailored vaccine communication is crucial to address the unique vulnerabilities and informational needs of cancer patients.
Misinformation from media and social platforms should be proactively addressed through accurate messaging from trusted sources.
Healthcare providers play a central role in shaping vaccine attitudes and should be actively involved in vaccine-related discussions.
Clear, culturally sensitive messaging enhances patient trust, understanding, overall health literacy
Future immunization efforts should avoid a one-size-fits-all approach, with targeted strategies for high-risk and immunocompromised populations.

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