


Review Article

Rural Vaccine Hesitancy: Key Determinants and Interventions to Improve Vaccine Uptake

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Abstract

While vaccines have been developed to provide protection against many threatening diseases, they are not yet universally accepted. Many individuals opt out of receiving vaccination, with lower vaccination rates often found in rural areas compared to urban areas. Vaccine hesitancy is a leading factor for not obtaining vaccinations. Risk determinants and barriers associated with vaccine hesitancy, along with intervention strategies to address these challenges, have been identified.

Keywords: Vaccines; Rural medicine; Public health

Introduction

Vaccine hesitancies have existed since the development of vaccines, and its persistence throughout the coronavirus disease 2019 (COVID-19) pandemic has contributed to the difficulties in attaining herd immunity [1]. In rural communities, the chances of being vaccinated are lower than in urban cities [2]. Due to the differences in regionality and lifestyles, distinct approaches when addressing vaccine hesitancy in rural areas should be considered [3]. A literature review was conducted using literature relevant to vaccine hesitancy found in rural populations. In PubMed, a simple literature search on February 8, 2026, was performed using the phrase “vaccine hesitancies in rural areas”. From the search, the first ten literatures presented were summarized. Information targeted towards vaccine hesitancy in rural populations was stressed. Nine of ten articles were found to focus on hesitancy with respect to the COVID-19 vaccinations.

Explanation

In rural areas, where there is limited accessibility to healthcare resources, family medicine physicians are essential in approaching vaccine hesitancy and increasing vaccination uptake [4]. This article explores the socioeconomic and demographic relations to vaccine hesitancy in South Tyrol, Italy [4]. Results indicate that a worsened economy due to the COVID-19 pandemic, poor education, and a large population of young children are factors contributing to the discrepancy between rural and urban vaccine hesitancy [4]. Conventional rather than radical strategies for rural medicine physicians to increase vaccination are supported, including developing a trusting relationship, offering education, improving access, and identifying vulnerable populations, with proper communication of vaccine information to hesitant patients being stressed [4].

A study was conducted in South Tyrol, Italy to analyze the risk predictors associated with COVID-19 vaccination hesitancy in urban and

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rural populations [5]. Hesitant views were more often seen in rural populations [5]. Age, information search frequency, agreement level with national vaccination plan, and thought alignment with conspiracy theories are risk predictors present in both rural and urban populations [5]. Lack of chronic disease, increased altruism, and increased resilience are significant risk predictors present only in rural populations [5]. It is also noteworthy that in north of Italy, where there is a better economic situation, residency does not determine COVID-19 vaccine hesitancy [5]. Furthermore, as chronic diseases, altruism, and resilience are difficult factors to target for vaccination interventions, no differences in the methods of intervention between rural and urban populations are suggested [5].

To increase the representation of residency and cultures, a study was conducted over multiple countries – Norway, U.S., UK, and Australia – to analyze specific reasons by individuals for their perspective on vaccines [6]. Those who received COVID-19 vaccination most frequently made their decision due to illness risk reduction, protection of others' wellbeing, and trust in public health information [6]. Those who did not receive COVID-19 vaccination most frequently made their decision largely due to side effect concerns [6]. Distrust in public health authorities and policies was also expressed by many who did not receive the vaccine [6]. In the context of population density, all reasons, except religious beliefs, for vaccine hesitancy tended to be given more frequently in low-population regions [6]. The article proposed that cooperation between institutions that have influence on the perspectives of vaccines can help foster trust in health policies and authorities, leading to a more positive outlook on the vaccine [6].

Perspectives on vaccines fluctuate dynamically due to numerous factors throughout time [3]. To determine the behavioral determinants associated with accepting the COVID-19 vaccine in a limited setting, a study was performed before widespread vaccine availability in rural areas across Bangladesh, India, Myanmar, Kenya, the Democratic Republic of the Congo (DRC), and Tanzania [3]. The behavioral determinants with very strong associations to vaccine perspectives include the perception of how friends and family view the vaccines, trust in the vaccines, perception of vaccine safety, perception of pros and cons to receiving the vaccine, perception of susceptibility to acquiring COVID-19, perception of threat to acquiring COVID-19, and perception of vaccine accessibility [3]. The perception of self-efficacy, trust in health authorities, and religious views also had high association to vaccine perspectives, though not to the extent of the former stated [3]. Along with accurate COVID-19 disease and COVID-19 vaccine information, it is suggested that behavioral determinants should also be informed to community leaders and healthcare workers in order to develop more effective public health strategies addressing hesitancy [3].

As important as it is to consider risk determinants influencing vaccine hesitancy, actual actions taken to address the challenges presented by these determinants are just as important. In the rural populations of Lincolnshire County in the UK, initiatives and interventions taken to promote COVID-19 vaccinations were documented from those involved in these efforts [1]. Success was found in working with local community members and organizations to spread messages advocating for the vaccine [1]. The necessity to consider the specific situation of each setting when developing intervention strategies was emphasized [1]. While pop-up and mobile clinics increase accessibility in receiving vaccines, some local audiences may not welcome such efforts due to their culture [1]. Social media was effective in reaching younger audiences, and traditional media, including TV and radio, were more effective in reaching older audiences [1]. Due to the complex nature of vaccine hesitancy in rural settings, nonconventional methods to address specific audiences are recommended by the authors [1].

While there is a shortage of healthcare workers in rural areas of the U.S., community pharmacists are one of the few professionals that are often more accessible [2]. A protocol was designed to study the effectiveness of implementation strategies adopted from Human Papillomavirus (HPV) vaccine intervention strategies in intervening with COVID-19 vaccine hesitancy in a community pharmacy setting [2]. The standard implementation consists of conventional training and resources for pharmacists to support how they address vaccine hesitant patients [2]. The standard implementation can be compared to standard implementation combined with virtual facilitation, which includes a trained facilitator who will support and guide the pharmacist throughout the implementation process [2]. By analyzing the study, information regarding how the implementation strategies contribute to the fidelity of the pharmacists to use the learned vaccine hesitancy interventions, the effectiveness of the interventions, and the cost-effectiveness can be obtained [2].

In the rural states of Idaho and Alaska, healthcare providers and community members were inquired to identify determinants of COVID-19 vaccine hesitancy which were classified into the categories of confidence, complacency, and convenience [7]. Vaccine hesitancy themes and sub-themes in the confidence and complacency categories appeared particularly prevalent in the study [7]. Factors impacting vaccine hesitancy in the confidence category include patients' unfulfilled wishes to understand and have an active role in their health decisions, distrust in those involved in the development and policy-making of COVID-19 vaccines, and skepticism about information shared to the public [7]. For the factors in the complacency category, both community members and physicians perceived that they were at lower risk of contracting COVID-19 and that receiving the condition would be less severe for them [7]. Through understanding the

significance of these risk determinants, proper emphasis can be taken to directly intervene them [7].

Many studies seeking to promote COVID-19 vaccine uptake often compare how different factors and interventions influence patient's willingness to vaccinate [8]. In the Boeny region of Madagascar, the distinction between the willingness to vaccinate and actually receiving the vaccine was explored through associated drivers and factors [8]. The primary motivations for those willing to vaccinate and those with vaccine uptake both place significance on protecting their health and their close ones' health [8]. However, the primary motivation for those willing to vaccinate also includes protecting the community's health, while those with vaccine uptake listed free vaccine availability and access to travel as additional primary motivations [8]. This highlights the difference between the influences of willingness and actually vaccinating [8]. Along with this, living in an urban area increased chances of vaccine uptake notably compared to rural areas, which is important as most of Madagascar's population resides in rural areas [8]. Emphasizing the improvement of vaccination strategies to target remote communities, largely through implementing community health workers, is recommended [8].

While most recent studies related to vaccine perspectives focuses on COVID-19 related topics, vaccine hesitancy has been a persistent concern throughout history, relevant in previous epidemics. Thus, this review addresses the challenges and facilitators surrounding vaccines received during early childhood in U.S. rural communities [9]. A trusting relationship between parents and healthcare providers was highlighted, but also the relationship between parents and immunization nurses, as rural primary care providers often refer patients to public health entities to receive immunization [9]. Providers who deliver vaccine information presumptively, such that they assume parents are planning to provide immunity to their children, is an effective communication method [9]. Immunization tracking, reminder notifications, and access to vaccination facilities are also indicated themes that foster childhood immunization [9]. Parental vaccine hesitancy is also identified as a major theme, although its documentation in respect to population residency and its intersection with other challenges remains ill-defined [9].

Trusted messengers (TMs), or individuals who are influential and seen as credible sources in their community, have the potential to reach wide audiences [10]. A series of online meetings for trusted messengers, a trusted messenger forum (TMF), in rural areas of the Finger Lakes region in New York was initiated to support their involvement in reducing COVID-19 vaccine hesitancy [10]. By creating a low-pressure environment where experiences and concerns can be shared, members can help formulate solutions and recommendations to improve future situations [10]. As

some TMs expressed community members' concerns for trust and misinformation, a toolkit containing materials with accurate information related to the vaccine was created [10]. Confidence among TMs in having personalized conversations about the vaccine with vaccine hesitant members was also a challenge presented [10]. The TMF resolved this through hosting a workshop, allowing TMs to practice role-playing conversations on various topics related to vaccination [10]. This clarified many TMs' uncertainties and increased their confidence in having vaccine conversations [10]. With the TM participants endorsing TMFs and finding value in their experiences in the sessions, TMFs are suggested to be a sustainable implementation strategy in vaccination campaigns [10].

Conclusion

The articles express how the influence of vaccine hesitancies in rural populations continues to be an overlooked challenge. Socioeconomic and behavioral risk factors associated with vaccine hesitancies were identified, with trust being a recurring theme. The implementation and direct intervention strategies proposed to address hesitancy barriers can foster future discussions and research for effective incorporation.

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Conflict of Interest

None of the authors listed have any conflict of interests to disclose.

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