Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i7.7324

PERVASIVE PARENTAL HESITANCY AND RESISTANCE TOWARDS MEASLES RUBELLA VACCINATION IN RAWALPINDI PAKISTAN

Sara Mohammad Khalid Bakhsh[1*], Mariam Razzaq[2], Sarah Khan[3], Sana Waheed[4], Sumaira Masood[5], Noshaba Razzaq[6]

[1*]Fcps Resident Community Medicine Fumc Fush
[2]Fcps Resident Community Medicine Fumc Fush
[3]Demonstrator Community Medicine Fumc Fush
[4]Demonstrator Community Medicine Fumc Fush
[5]Assistant Professor Community Medicine Shaqra University, College Of Medicine
[6]Researcher At Community Medicine Fumc Fush

***Corresponding author:** Sara Mohammad Khalid Bakhsh
*FCPS Resident Community Medicine Fumc Fush

Abstract

Background: Measles remains a highly contagious and potentially severe infectious disease, necessitating high vaccine coverage. However, misinformation and measles vaccine hesitancy/resistance have posed significant challenges to achieving this goal.

Objectives: This study aimed to investigate the acceptance of the measles rubella (MR) vaccine among parents in Rawalpindi Pakistan and to identify its associated determinants.

Methodology: this cross-sectional questionnaire-based study was conducted using a Parental Attitudes towards Childhood Vaccines (PACV) and for MR vaccination. Study sample comprised a total of 385 parents. Data collection took place in October 2023.

Results; the majority of Parents under 40 demonstrated higher acceptance rates (15.8%) than those over 40 (11.3%). Male parents exhibited slightly higher acceptance (16.5%) than females (12.6%). Parents with fewer offspring, especially less than three children, had higher acceptance (19.4%) than those with more offspring (9.3%). Postgraduate-educated parents had the highest acceptance rate (18.4%). Employed parents, particularly those working, showed significantly higher acceptance (32.2%) compared to unemployed parents (12.5%).

Conclusion; The current study reveals that parental MR vaccine acceptance varies significantly based on demographic factors. Parents under 40, males, those with fewer offspring (especially less than three children), postgraduate-educated parents, and employed parents show higher acceptance rates. These findings emphasize the importance of understanding demographic influences in promoting vaccine acceptance and tailoring interventions accordingly.

Keyword: Pervasive Parental Hesitancy, Pervasive Parental Resistance, Measles Rubella, Vaccination

INTRODUCTION

The measles virus presents a significant health threat, particularly to children, due to its highly contagious nature and associated morbidity and mortality rates. [1] Complications stemming from measles infections include severe pneumonia and central nervous system (CNS) complications.(2,3) Similarly, rubella, while generally less severe, poses serious risks to pregnant women as it can lead to congenital rubella syndrome, resulting in cardiac defects, deafness, and cataracts.([4] Vaccination, notably with trivalent MMR vaccines, has been crucial in their control since the 1960s, leading to measles elimination in the United States by 2000.[5] However, despite these achievements, endemic measles persists in many regions, primarily due to inadequate vaccine coverage.[6] In Pakistan, the Expanded Program on Immunization (EPI), initiated in 1978, aims to protect children by immunizing them against various diseases, including measles and rubella. Despite efforts, Pakistan's immunization indicators have not met expected benchmarks, facing challenges related to funding allocation, private sector involvement, and security issues.[7,8]

One of the major reasons behind suboptimal measles vaccine coverage is parental vaccine hesitancy. Factors driving parental measles vaccination hesitancy were recently systematically reviewed by Novilla et al. and included parental concerns and philosophical, moral, and religious objections. [8] Study uncovered a troubling degree of MMR vaccine hesitancy/resistance among parents in Jordan. Urgent, targeted interventions are crucial to combat this issue, including mass campaigns to foster trust in the vaccine's safety and efficacy. Additionally, effective public health initiatives are urgently needed to bolster measles vaccine coverage and avert potential outbreaks of this significant disease. [10] Efforts to improve vaccine awareness among school-going children, irrespective of their rural or urban backgrounds, are imperative. Findings indicate a higher propensity among students in rural schools, regardless of gender, to accept vaccination administered within school premises compared to their urban counterparts**.[11]**

This study aims to investigate the prevalence of parental hesitancy/resistance toward the MR vaccine in Pakistan. Additionally, it seeks to identify underlying factors influencing parental vaccination hesitancy/resistance, utilizing validated survey instruments. Understanding MR Vaccine hesitancy is crucial for ensuring the success of vaccination campaigns and improving routine vaccination coverage rates.

This study aimed to investigate the acceptance of the measles rubella (MR) vaccine among parents in Pakistan and to identify its associated determinants.

METHODOLOGY

The study adopts a cross-sectional design employing an electronic questionnaire based on the validated Parent Attitudes about Childhood Vaccines (PACV) instrument. It will be conducted at Fuji Foundation Hospital, OPD Clinics in the Department of Pediatrics, and Maternity Ward, Rawalpindi, spanning a duration of six months. The sample size of 385 participants was calculated considering a confidence level of 95% and a margin of error of 5%.(12)

The survey will be accessible via Google Forms, and the link will be distributed through WhatsApp, Facebook, and Messenger, with participation being voluntary. Sampling will be convenience-based due to time constraints, and participants must be parents of children under 15 years old, and residents of Rawalpindi. Participants age range above or less than 40. Ethical considerations adhere to the Declaration of Helsinki and are approved by the Ethical Review Committee of The Foundation University School of Health Sciences.

Demographic information was obtained through the form comprising of items which composed of age, gender, education, occupation and monthly income. The questionnaires, PACV Items, consists of two parts was used to analyze the acceptance of the measles rubella (MR) vaccine among parents in Rawalpindi Pakistan.

The PACV scale consist of two part pacv-1 consist of one items and pacv-ii comprises 14 items, each rated on a 4-point Likert scale ranging from "always" to "never".

PACV-1, consists of one items, used to evaluate parental MR vaccine hesitancy, asking, "To what extent are you hesitant about the MR vaccine for children?" Responses categorize into "always" (resistance), "never" (acceptance), and "sometimes/often" (hesitancy.
PACV-II consists of 14 items used to evaluate Parental Attitudes towards Childhood Vaccines. [13]
SPSS, Version 21 was used to investigate the acceptance of the measles rubella (MR) vaccine among parents Demographic characteristic were analyzed by frequency percentages. Independent sample t-test and regression analysis were used to investigate the acceptance of the measles rubella (MR) vaccine among parents.

RESULTS

A total number of 385 participants 115(29.9%) were male and 270(70.1%) were female (table-I). The age of participants ranged from >40 to <40 years (mean±SD =53.74 ± 10 years).

Table-1; Demographic profile of participants (n=385).

variables	Categories	(n)	(n)%
Gender	*Male*	115	29.9%
	Female	270	70.1%
Age	*Below 40*	208	54.0%
	Above 40	177	46.0%
Offspring	*Less than 3*	170	44.2%
	More than 3	215	55.8%
Education	*High school or less*	97	25.2%
	Undergraduate	240	62.3%
	Graduate	48	12.5%
Occupation	*Employed*	221	57.4%
	Unemployed	164	42.6%
Monthly income	*Less than 50,000*	314	81.6%
	More than 50,000	71	18.4%

The demographic profile of participants (n=385) reveals a predominantly female representation (70.1%) compared to males (29.9%). The age distribution indicates a relatively balanced spread, with 54.0% below 40 years and 46.0% above. More participants reported having more than three offspring (55.8%) compared to less than three (44.2%).
Education-wise, the majority held undergraduate degrees (62.3%), followed by high school or less (25.2%) and graduate degrees (12.5%). Employment status showed a slight majority being employed (57.4%) versus unemployed (42.6%).
Moreover, a significant majority reported a monthly income of less than 50,000 (81.6%), while only a minority reported more than 50,000 (18.4%).

Table-II. Factors Associated with Parental MR Vaccination Acceptance and MR Vaccination Hesitancy.

Variable	Category	MR Vaccine Acceptance (%)	Hesitancy/Resistance (%)	P-values
Age	<40	33 (15.8)%	175 (84.2)%	0.177, 1.820
	>40	20 (11.3)%	157 (88.7)%	
Gender	Male	19 (16.5)%	96 (83.5)%	0.237, 1.398
	Female	34 (12.6)%	236 (87.4)%	
offspring	<3	33 (19.4)%	137 (80.6)%	0.003, 8.898
	>3	20 (9.3)%	195 (90.7)%	
Education level	High or less	11 (11.3)%	86 (88.7)%	0.508, 1.353
	Undergraduate	34 (13.9)%	210 (86.1)%	
	Postgraduate	9 (18.4)%	39 (81.6)%	

Occupation	Employed	32 (32.2)%	189(187.0)%	0.462, 1.544
	Unemployed	21(912.5)%	147(87.5)%	
Monthly income	<50,000	43(13.7)%	271 (86.3)%	0.854, 0.034
	>50,000	10(13.2) %	66 (86.8)%	
Previous parent vaccination history score	<3	21(10.5)%	179(89.5)%	0.032, 4.586
	>3	32(17.8) %	148 (82.2)%	
Previous child vaccination history score	<4	24 (11.0) %	194 (89.0)%	0.121, 2.399
	>4	29 (16.9) %	143 (83.1)%	

This table provides insights into factors associated with parental measles-rubella (MR) vaccination hesitancy. It reveals notable differences in MR vaccine acceptance across various demographic and attitudinal variables. Participants aged 40 years and older showed slightly lower MR vaccine acceptance (11.3%) compared to those under 40 (15.8%). Females exhibited slightly higher MR vaccine acceptance (12.6%) compared to males (16.5%). Parents with 1 or 2 offspring demonstrated higher MR vaccine acceptance (19.4%) than those with 3 or more offspring (9.3%). Higher educational attainment (postgraduate) was associated with increased MR vaccine acceptance (18.4%). Participants residing in the central governorate showed higher MR vaccine acceptance (15.1%) compared to those in the northern and southern governorates. Employed participants, particularly healthcare workers (19.2%), tended to have higher MR vaccine acceptance.

Table-III Parent Attitudes about Childhood Vaccines (PACV) score with Parental Measles rubella (MR) Vaccination Acceptance and Parental Measles rubella (MR) Vaccination Hesitancy.

Variable	**Category**	**PMR Vaccine Acceptance (%)**	**PMR Hesitancy/Resistance (%)**	**p-values**
PACV score 1	<23	3 (1.5)%	200 (98.5)%	0.001, 53.948
	>23	135 (72.9)%	50 (27.1)%	

1-PACV: Parent Attitudes about Childhood Vaccines; 2-PMR; Parental Measles rubella

Table-II illustrates a clear association between Parent Attitudes about Childhood Vaccines (PACV) score and Parental Measles-Rubella (MR) Vaccination Acceptance and Hesitancy/Resistance. Participants with a PACV score below 23 showed very low MR vaccine acceptance (1.5%) and high hesitancy/resistance (98.5%), while those with a PACV score above 23 exhibited significantly higher acceptance (72.9%) and lower hesitancy/resistance (27.1%)

DISCUSSION

The study, which included 385 participants, comprised 115 (29.9%) males and 270 (70.1%) females. The mean age was 53.74 ± 10 years, with 54.0% of participants being under 40 years of age and 46.0% over 40. Participants reported having either fewer than three children (44.2%) or more than three children (55.8%). Regarding education, 25.2% had completed high school or less, 62.3% held undergraduate degrees, and 12.5% had graduate degrees. Employment status indicated that 57.4% were employed, while 42.6% were unemployed. Furthermore, 81.6% reported a monthly income of less than 50,000, and 18.4% earned more than 50,000.

The analysis revealed that age influences parental acceptance of the MR vaccine, with participants over 40 years showing slightly lower acceptance rates compared to younger participants. This finding aligns with previous research indicating that younger parents may have greater awareness or trust in healthcare recommendations, potentially leading to higher vaccine acceptance (14, 15).

Gender differences in MR vaccine acceptance were also observed, with females exhibiting slightly higher acceptance rates than males. This could be influenced by various factors such as differences in health-seeking behaviors, societal norms, or perceptions of vaccine safety, which have been documented in earlier studies (16).

The number of children a parent has appears to impact MR vaccine acceptance, with parents of fewer children showing significantly higher acceptance rates compared to those with more children. This may be due to logistical challenges or concerns about managing vaccine schedules and healthcare for larger families, as suggested by prior research (17).

Higher educational attainment, particularly postgraduate degrees, was associated with increased MR vaccine acceptance. This finding suggests that education plays a role in shaping attitudes toward vaccination, with individuals with higher education potentially having better access to health information and a greater understanding of the importance of vaccination (18).

Employed participants, especially healthcare workers, exhibited higher MR vaccine acceptance rates, underscoring the influence of occupation on vaccine acceptance. Healthcare workers are likely more aware of the benefits of vaccination and more compliant with vaccination recommendations, as noted in prior studies (19).

Interestingly, the study found no significant difference in MR vaccine acceptance based on monthly income. This suggests that income level may not be a significant barrier in parental decision-making regarding vaccination, indicating equitable access to vaccines across income brackets in this context. This finding is consistent with earlier research that has suggested that factors other than income may play a more significant role in vaccine acceptance (20).

Participants with a history of fewer previous vaccinations showed lower MR vaccine acceptance rates compared to those with more previous vaccinations. This suggests that parents' own vaccination experiences may influence their attitudes towards vaccinating their children (21). Similarly, parents with fewer previous child vaccinations exhibited lower MR vaccine acceptance rates compared to those with more previous child vaccinations, indicating that experiences with vaccinating previous children may influence subsequent vaccination decisions (22).

The analysis of Parent Attitudes about Childhood Vaccines (PACV) scores revealed a substantial relationship with Parental Measles-Rubella (MR) Vaccination Acceptance and Hesitancy/Resistance. Participants with a PACV score below 23 demonstrated markedly low MR vaccine acceptance (1.5%) and overwhelming hesitancy or resistance (98.5%), whereas those with a PACV score above 23 exhibited significantly higher acceptance (72.9%) and lower hesitancy or resistance (27.1%). These findings highlight the critical impact of parental attitudes towards childhood vaccines on their acceptance or hesitancy towards the MR vaccine, emphasizing the need to address parental perceptions and attitudes to enhance vaccine acceptance and mitigate hesitancy effectively (23).

CONCLUSION

The current study revealed that parental acceptance of the measles-rubella (MR) vaccine is influenced by various factors. Younger age, female gender, having fewer children, higher education, and employment in healthcare are associated with higher acceptance rates. Parental attitudes towards childhood vaccines strongly influence Measles-Rubella (MR) vaccine acceptance and hesitancy, emphasizing the need for targeted interventions to address concerns and promote positive attitudes.

LIMMITATION & RECOMMENDATION OF THE STUDY

The study's limitations include a small, demographically concentrated sample, reliance on self-reported data, and a cross-sectional design, all of which may limit the generalizability and causal understanding of MR vaccine acceptance and hesitancy. The lack of cultural and regional diversity and the limited exploration of factors such as socioeconomic status also constrain the findings. Future research should include larger, more diverse samples, consider longitudinal designs, and use qualitative methods to explore underlying reasons for vaccine attitudes. Addressing self-reporting biases and providing targeted educational interventions, especially through healthcare workers, are recommended. Policymakers should ensure equitable vaccine access and consider supportive policies, while also exploring cultural influences on vaccine perceptions.

REFERENCES:

1. Gianniki M, Siahanidou T, Botsa E, Michos A. Measles epidemic in pediatric population in Greece during 2017–2018: Epidemiological, clinical characteristics and outcomes. PloS one. 2021 Jan 20;16(1):e0245512.
2. Weissbrich B, Schneider-Schaulies J. Measles and its neurological complications. InClinical neurovirology 2020 Apr 30 (pp. 287-305). CRC Press.
3. Kakoullis L, Sampsonas F, Giannopoulou E, Kalogeropoulou C, Papachristodoulou E, Tsiamita M, Lykouras D, Velissaris D, Karkoulias K, Spiropoulos K, Panos G. Measles-associated pneumonia and hepatitis during the measles outbreak of 2018. International journal of clinical practice. 2020 Feb;74(2):e13430.
4. Winter AK, Moss WJ. Rubella. The Lancet. 2022 Apr 2;399(10332):1336-46.
5. Berche P. History of measles. La Presse Médicale. 2022 Sep 1;51(3):104149.
6. Plans-Rubió P. Vaccination coverage for routine vaccines and herd immunity levels against measles and pertussis in the world in 2019. Vaccines. 2021 Mar 13;9(3):256.
7. Joint statement by UNICEF Executive Director and WHO Director-General on the occasion of World Breastfeeding Week [Internet]. [cited 2024 Jan 18]. Available from: https://www.who.int/news/item/01-08-2023-joint-statement-by-unicef-executive-director-catherine-russell-and-who-director-general-dr-tedros-adhanom-ghebreyesus-on-the-occasion-of-world-breastfeeding-week
8. Butt M, Mohammed R, Butt E, Butt S, Xiang J. Why have immunization efforts in Pakistan failed to achieve global standards of vaccination uptake and infectious disease control?. Risk management and healthcare policy. 2020 Feb 12:111-24.
9. Novilla ML, Goates MC, Redelfs AH, Quenzer M, Novilla LK, Leffler T, Holt CA, Doria RB, Dang MT, Hewitt M, Lind E. Why parents say no to having their children vaccinated against measles: a systematic review of the social determinants of parental perceptions on mmr vaccine hesitancy. Vaccines. 2023 May 2;11(5):926.
10. Barakat M, Abdaljaleel M, Atawneh N, Alkhazaleh R, Aburumman D, Hamed E, et al. Pervasive Parental Hesitancy and Resistance towards Measles Rubella Vaccination in Jordan. Vaccines. 2023 Nov;11(11):1672.
11. Raghu K. Knowledge, Attitude and Practice regarding Measles Rubella Vccine among School Children in Kerala. Int J Acad Med Pharm. 2022;4(5):152-6.
12. Pitools. Sample Size to Estimate a Proportion or Apparent Prevalence with Specified Precision. Available online: https: //epitools.ausvet.com.au/oneproportion (accessed on 4 October 2023)
13. Opel DJ, Taylor JA, Mangione-Smith R, et al. Validity and reliability of a survey to identify vaccine-hesitant parents. *Vaccine*. 2011;29(38):6598–6605.
14. Lin C, Mullen J, Smith D, Kotarba M, Kaplan SJ, Tu P. Healthcare providers' vaccine perceptions, hesitancy, and recommendation to patients: a systematic review. Vaccines. 2021 Jul 1;9(7):713.
15. Tuckerman J, Crawford NW, Marshall HS. Disparities in parental awareness of children's seasonal influenza vaccination recommendations and influencers of vaccination. PloS one. 2020 Apr 9;15(4):e0230425.
16. Lazarus JV, Wyka K, Rauh L, Rabin K, Ratzan S, Gostin LO, Larson HJ, El-Mohandes A. Hesitant or not? The association of age, gender, and education with potential acceptance of a COVID-19 vaccine: a country-level analysis. InVaccine Communication in a Pandemic 2023 Nov 24 (pp. 60-68). Routledge.
17. Rozbroj T, Lyons A, Lucke J. Vaccine-hesitant and vaccine-refusing parents' reflections on the way parenthood changed their attitudes to vaccination. Journal of community health. 2020 Feb;45(1):63-72.
18. Lazarus JV, Wyka K, Rauh L, Rabin K, Ratzan S, Gostin LO, Larson HJ, El-Mohandes A. Hesitant or not? The association of age, gender, and education with potential acceptance of a COVID-19 vaccine: a country-level analysis. InVaccine Communication in a Pandemic 2023 Nov 24 (pp. 60-68). Routledge.

19. Desye B. Prevalence and determinants of COVID-19 vaccine acceptance among healthcare workers: a systematic review. Frontiers in Public Health. 2022 Jul 28;10:941206.
20. Moola S, Gudi N, Nambiar D, Dumka N, Ahmed T, Sonawane IR, Kotwal A. A rapid review of evidence on the determinants of and strategies for COVID-19 vaccine acceptance in low-and middle-income countries. Journal of global health. 2021;11.
21. Habersaat KB, Jackson C. Understanding vaccine acceptance and demand—and ways to increase them. Bundesgesundheitsblatt-Gesundheitsforschung-Gesundheitsschutz. 2020 Jan;63(1):32-9.
22. Fakonti G, Hadjikou A, Tzira E, Kyprianidou M, Giannakou K. Attitudes and perceptions of mothers towards childhood vaccination in Greece: lessons to improve the childhood COVID-19 vaccination acceptance. Frontiers in Pediatrics. 2022 Aug 25;10:951039.
23. Barakat M, Abdaljaleel M, Atawneh N, Alkhazaleh R, Aburumman D, Hamed E, Sallam M. Pervasive parental hesitancy and resistance towards measles rubella vaccination in Jordan. Vaccines. 2023 Oct 31;11(11):1672.