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ORIGINAL ARTICLE / ARAŞTIRMA YAZISI

Immunology (Other)/İmmünoloji (Diğer)

Evaluation of Spiritual Well-Being, Vaccine Hesitancy, and Vaccine Advocacy Among Parents of Children Aged 0–2 Years

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ABSTRACT

Purpose: Although vaccination is one of the most effective public health interventions against infectious diseases, vaccine hesitancy has been increasing globally. Parental vaccine decisions may be influenced by multidimensional factors, including belief systems and spiritual well-being. This study evaluates the relationships between spiritual well-being, vaccine hesitancy, and vaccine advocacy among parents of children aged 0–2 years.

Materials and Methods: This cross-sectional study was conducted with 164 parents at the Pediatric Outpatient Clinics and Wards of Sivas Cumhuriyet University between 16 January and 2 April 2026. Data were collected using the Spirituality Index of Well-Being (SIWB), the Vaccine Conspiracy Beliefs Scale (VCBS), and the Vaccine Advocacy Scale (VAS). Mann-Whitney U, Kruskal-Wallis (Bonferroni post-hoc), Spearman correlation, and binary logistic regression were used.

Results: Of the parents, 17.1% (n=28) had refused or delayed at least one vaccine. SIWB correlated negatively with VCBS (rs=-0.167, p=0.033) and positively with VAS (rs=0.235, p=0.002). VCBS correlated negatively with VAS (rs=-0.344, p<0.001); this relationship was stronger for the Community Advocacy subscale (rs=-0.417, p<0.001). Education was associated with SIWB and VAS (p<0.001) but not with VCBS (p=0.152). In logistic regression, VCBS was the only significant predictor of vaccine refusal (OR=1.153, 95% CI: 1.076–1.235, p<0.001); model accuracy was 84.8%.

Conclusion: Parents with higher spiritual well-being showed lower vaccine hesitancy and greater vaccine advocacy. Vaccine hesitancy was independent of education and affected all socioeconomic groups. The strong negative association between Community Advocacy and vaccine hesitancy points to the importance of training parents as active vaccine advocates.

Keywords: Spirituality, vaccination hesitancy, parents, immunization, infant

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ÖZET

Amaç: Aşılama bulaşıcı hastalıklarla mücadelede en etkili halk sağlığı müdahalelerinden biri olmasına rağmen, aşı tereddüdü küresel düzeyde artmaktadır. Ebeveynlerin aşı kararları, inanç sistemleri ve spiritüel iyilik hâli dahil çok boyutlu faktörlerden etkilenebilmektedir. Bu çalışmada 0–2 yaş çocuğu olan ebeveynlerde spiritüel iyilik hâli, aşı karşıtlığı ve aşı savunuculuğu arasındaki ilişkilerin değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem: Kesitsel tasarımdaki bu araştırma, 16.01.2026–02.04.2026 tarihleri arasında Sivas Cumhuriyet Üniversitesi Çocuk poliklinikleri ve servislerinde 164 ebeveyn ile yürütülmüştür. Veriler Spiritüel İyilik Ölçeği (SİÖ), Aşı Karşıtlığı Ölçeği (AK) ve Aşı Savunuculuğu Ölçeği (AS) ile toplanmıştır. Mann-Whitney U, Kruskal-Wallis (Bonferroni post-hoc), Spearman korelasyon ve binary lojistik regresyon kullanılmıştır.

Bulgular: Ebeveynlerin %17.1'i (n=28) en az bir aşıyı reddetmiş veya ertelemiştir. SİÖ ile AK arasında zayıf negatif (rs=-0.167, p=0.033), SİÖ ile AS arasında pozitif (rs=0.235, p=0.002) korelasyon saptanmıştır. AK ile AS arasında negatif korelasyon bulunmuştur (rs=-0.344, p<0.001); bu ilişki Toplumsal Savunuculuk alt boyutunda daha güçlüdür (rs=-0.417, p<0.001). Eğitim düzeyi SİÖ ve AS ile ilişkili (p<0.001) ancak AK ile ilişkisizdir (p=0.152). Lojistik regresyonda AK aşı reddinin tek anlamlı açıklayıcısıdır (OR=1.153, %95 GA: 1.076–1.235, p<0.001); model doğruluğu %84.8'dir.

Sonuç: Spiritüel iyilik hâli yüksek ebeveynler daha düşük aşı karşıtlığı ve daha yüksek aşı savunuculuğu sergilemektedir. Aşı karşıtlığı eğitim düzeyinden bağımsız olup tüm sosyoekonomik grupları etkilemektedir. Toplumsal Savunuculuk boyutunun aşı karşıtlığıyla olan güçlü negatif ilişkisi, ebeveynlerin aktif aşı savunucuları olarak yetiştirilmesinin önemine işaret etmektedir.

Anahtar Kelimeler: Spiritüalite, aşı tereddüdü, ebeveynler, bağışıklama, bebek

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Vaccination is one of the most successful and cost-effective public health interventions developed against infectious diseases (1,2). Globally, vaccines prevent an estimated two to three million deaths each year, with an additional 1.5 million deaths preventable through expanded coverage (3). However, the resurgence of vaccine-hesitant attitudes over the past two decades threatens these gains (4). In its 2019 report, the World Health Organization (5) identified vaccine hesitancy as one of the ten leading threats to global health, and a recent umbrella review of 78 meta-analyses reported a pooled vaccine hesitancy rate of 32% in the general population, with markedly lower acceptance among parents (61.3%) than among other groups (6). A parallel rise has been observed in Türkiye, where the number of families refusing to vaccinate their children increased from 183 in 2011 to 23,000 in 2018 and exceeded 40,000 in 2019 (7,8).

Parental vaccine decisions are shaped by multidimensional factors, including individual perceptions of vaccines, intuitive risk-benefit assessments, public attitudes toward the pharmaceutical industry, and perceived quality of vaccination services (9). Belief systems and spiritual well-being are among these (10). Spirituality is an abstract concept that covers the individual's search for meaning and place in the universe. Spiritual well-being affects how individuals perceive health and illness and contributes to quality of life (11,12). Common drivers of vaccine hesitancy include distrust of vaccine ingredients, concerns about adverse effects, religious beliefs, and misinformation circulated through social media (2,13,14). A recent multi-country study showed that socioeconomic disparities, particularly in social support and health literacy, drive parental hesitancy independently of educational attainment (15), and area-level analyses have shown that parental hesitancy clusters geographically and predicts lower vaccine coverage at the community level (16). Against this background, evidence-based vaccine advocacy has been proposed, and training vaccine advocates in collaboration with community stakeholders is considered an effective approach (17,18).

The 0–2 age group was selected for this study because childhood immunization schedules are most intensive and developmentally critical during this period. In Türkiye, where the sample was recruited, the Expanded Programme on Immunization includes 13 antigens administered within the first two years of life (BCG, hepatitis B, DTaP-IPV-Hib, PCV, OPV, MMR, varicella, and hepatitis A), making this age window the most vaccine-dense period in the national Schedule (19). The aim of this study is to evaluate the relationships between spiritual well-being, vaccine hesitancy, and vaccine advocacy among parents of children aged 0–2 years.

Material and Methods

Study Design

This is a cross-sectional study.

Setting, Population, and Sampling

The study was conducted using face-to-face data collection at the Pediatric Outpatient Clinics and Wards of Sivas Cumhuriyet University between 16 January 2026 and 2 April 2026. The sample size was calculated using the known-population formula as 164 (p=0.04, q=0.96, d=0.03, t=1.96, 95% CI). Parents who had a child aged 0–2 years, were literate in Turkish, and provided voluntary consent were included. Parents who declined participation or returned incomplete forms were excluded.

p=0,4 q=0,96 d=0,03 d2=0,0009 t=1,96 t2=3,8416

$$n = \frac{t^2 PQ}{d^2} = \frac{(3{,}8416).(0{,}4).(0{,}96)}{(0{,}0009)} = 164$$

Data Collection Tools

Personal Information Form: A questionnaire developed by the researchers based on a literature review was administered to the participants. (2,20). This questionnaire includes information on age, education, occupation, income, number of children, and immunization.

Spirituality Index of Well-Being (SIWB): Developed by Daaleman and Frey (21), the Turkish validity and reliability study was performed by Serbest and Akgün Şahin (22). The 12-item scale consists of Self-Efficacy (7 items) and Life Scheme (5 items) subscales with 5-point Likert responses. Total scores range from 12 to 60, with higher scores indicating greater spiritual well-being (original α=0.858).

Vaccine Conspiracy Beliefs Scale (VCBS): Developed by Wojtasik et al. (23) and adapted into Turkish by Ayten et al. (24) the 10-item unidimensional scale uses a 5-point Likert format (reverse scored). Total scores range from 10 to 50, with higher scores indicating greater vaccine hesitancy/conspiracy beliefs (original α=0.905).

Vaccine Advocacy Scale (VAS): Developed by Yorulmaz Demir (25). The 12-item scale consists of Individual Development (8 items) and Community Advocacy (4 items) subscales with 4-point Likert responses. Total scores range from 12 to 48, with higher scores indicating greater advocacy (original α=0.92).

The Cronbach's alpha coefficients in the present study were 0.897 for SIWB total (Self-Efficacy subscale: 0.946; Life Scheme subscale: 0.868), 0.887 for VCBS, and 0.873 for VAS total (Individual Development subscale: 0.845; Community Advocacy subscale: 0.819), indicating good internal consistency for all scales and subscales.

Ethical Approval

Ethical approval was obtained from the Health Sciences Research Ethics Committee of Sivas Cumhuriyet University (Decision No: 2025-12/23, dated 11.12.2025). Institutional permission was granted by the Pediatric Service and Outpatient Clinics of Sivas Cumhuriyet University (Document No: E-93596471-010.01-664530, dated 16.01.2026). Permission for use of the scales was obtained via e-mail from the original authors. Written and verbal informed consent was obtained from all participants. The study was conducted in accordance with the Declaration of Helsinki and the Good Clinical Practice Guidelines.

Statistical Analysis

Data were analysed in IBM SPSS Statistics 23.0. The VCBS items were reverse coded (6–x). For the education variable, the literate-only category (n=1) was merged with the primary-education group as 'primary education and below'. Internal consistency was assessed with Cronbach's alpha and normality with the Shapiro-Wilk test. Because none of the scales met normality, non-parametric tests were used: Mann-Whitney U for pairwise comparisons and Kruskal-Wallis test (with Bonferroni-corrected post-hoc) for multiple groups. Relationships between scale scores were examined with Spearman correlation. Binary logistic regression (Enter method) was used to identify predictors of vaccine refusal. Statistical significance was set at $p<0.05$.

Results

Of the 164 parents who participated, 71.3% (n=117) were mothers and 28.7% (n=47) were fathers. Mean age was 31.02±5.88 years (median=30; range 18–52). Most respondents held a university degree (53.0%), while 35.4% had completed high school and 11.6% had primary education or below. Overall, 42.7% were employed, 71.3% resided in the provincial centre, 81.7% reported middle income, and 53.0% of families had one child (Table I).

Table 1. Sociodemographic and vaccination-related characteristics of parents (n=164)

Variable	n	%
Respondent		
Mother	117	71.3
Father	47	28.7
Education		
Primary and below	19	11.6
High school	58	35.4
University	87	53.0
Employment		
Employed	70	42.7
Not employed	94	57.3
Place of residence		
Province centre	117	71.3
District	34	20.7
Village	13	7.9
Income level		
Low	16	9.8
Middle	134	81.7
High	14	8.5
Number of children		
1	87	53.0
2	50	30.5
≥3	27	16.5
Knowledge of immunization schedule		
Yes	140	85.4
No	24	14.6
Information source		
Family Health Centre	117	71.3
Internet/social media	29	17.7
Other	18	11.0
All vaccines on time		
Yes	152	92.7
No	12	7.3
Vaccine refusal		
Yes	28	17.1
No	136	82.9
Reason for refusal (n=28)		
Does not believe in benefit	13	46.4
Concern about adverse effects	9	32.1
Other	6	21.5
New vaccine desired		
Yes	70	42.7
No	94	57.3

Respondent age: 31.02 ± 5.88, median = 30 (18–52). Spouse age: 32.27 ± 5.77, median = 32 (20–53).

Regarding vaccination behaviour, 85.4% reported having information about the immunization schedule, with the Family Health Centre (FHC) being the most common source (71.3%). While 92.7% had received all scheduled vaccines on time, 17.1% (n=28) had refused or delayed at least one vaccine. The most common reasons for refusal were not believing in the benefit of vaccines (46.4%) and concerns about adverse effects (32.1%). A negative attitude toward new vaccines was reported by 57.3% (Table I).

The mean total scores were 47.11±8.47 (median=47) for SIWB, 28.04±7.55 (median=29) for VCBS, and 36.44±7.84 (median=37) for VAS (Table II).

Parents who refused at least one vaccine had significantly higher VCBS scores (median=33 vs 27, p<0.001) and lower VAS scores (median=34 vs 38, p=0.022). Parents reporting negative attitudes toward new vaccines had higher VCBS (median=29 vs 25, p<0.001) and lower VAS scores (median=35 vs 40, p=0.022). Employed parents had higher SIWB scores (median=48 vs 46, p=0.032) (Table III).

Table 2. Internal consistency and descriptive statistics of the scales

Scale / Subscale	Mean ± SD	Median (Min–Max)
SIWB Total	47.11 ± 8.47	47 (16–60)
Self-Efficacy	26.23 ± 5.17	26 (11–35)
Life Scheme	20.88 ± 3.98	20 (5–25)
VCBS Total (reverse-coded)	28.04 ± 7.55	29 (10–50)
VAS Total	36.44 ± 7.84	37 (12–48)
Individual Development	24.39 ± 5.30	25 (8–32)
Community Advocacy	12.05 ± 3.33	13 (4–16)

SIWB: Spirituality Index of Well-Being; VCBS: Vaccine Conspiracy Beliefs Scale; VAS: Vaccine Advocacy Scale;

Table 3. Comparison of scale scores by demographic and vaccine-related variables

Variable	Group	n	SIWB	VCBS	VAS	p^1	p^2	p^3
Respondent	Mother	117	47(23-60)	28(11-50)	37(19-48)			
	Father	47	48(16-60)	30(10-50)	36(12-48)	0.265	0.050*	0.196
Employment	Employed	70	48(16-60)	29(10-50)	38(12-48)			
	Not employed	94	46(23-60)	28(11-50)	36(19-48)	0.032*	0.820	0.253
All vaccines	Yes	152	47(16-60)	28(10-50)	37(18-48)			
	No	12	50(23-60)	34(24-46)	32(12-47)	0.335	0.002**	0.091
Vaccine refusal	Yes	28	52(29-60)	33(17-50)	34(12-47)			
	No	136	47(16-60)	27(10-50)	38(18-48)	0.337	<0.001***	0.022*
New vaccine desired	Yes	70	48(16-60)	25(10-43)	40(19-48)			
	No	94	46(23-60)	29(11-50)	35(12-48)	0.490	<0.001***	0.022*
Education	Primary	19	45(27-60)	25(17-46)	33(22-47)			
	High school	58	45(23-60)	29(11-50)	34(19-48)			
	University	87	50(16-60)	28(10-50)	41(12-48)	<0.001***	0.152	<0.001***
Income	Low	16	42(27-60)	28(14-50)	37(22-47)			
	Middle	134	48(16-60)	28(10-50)	37(12-48)			
	High	14	47(29-60)	29(18-43)	35(19-48)	0.038*	0.976	0.573

*Values: Median (Min–Max). Pairwise: Mann-Whitney U; Multiple: Kruskal-Wallis. p^a: SIWB, p^b: VCBS, p^c: VAS. *p<0.05, **p<0.01, ***p<0.001. Education post-hoc (Bonferroni): SIWB: Primary < University (p=0.024), High school < University (p<0.001); VAS: Primary < University (p=0.017), High school < University (p<0.001). Income: SIWB: Low < Middle (p=0.042).*

Education level was significantly associated with SIWB (H=16.510, p<0.001) and VAS (H=20.113, p<0.001) but not with VCBS (H=3.769, p=0.152). University graduates scored higher on SIWB and VAS than other education groups. Income level was associated only with SIWB (H=6.556, p=0.038) (Table III).

Spearman analysis revealed a weak negative correlation between SIWB and VCBS (rs=-0.167, p=0.033), a weak-to-moderate positive correlation between SIWB and VAS (rs=0.235, p=0.002), and a moderate negative correlation between VCBS and VAS (rs=-0.344, p<0.001). This negative relationship was stronger for the Community Advocacy subscale (rs=-0.417, p<0.001). Number of children was negatively correlated with the SIWB Self-Efficacy subscale (rs=-0.210, p=0.007) (Table IV).

In binary logistic regression, the VCBS total score was the only significant predictor of vaccine refusal (OR=1.153, 95% CI: 1.076–1.235, p<0.001); each 1-point increase in VCBS increased the odds of refusal by 15.3%. VAS approached significance (OR=0.941, p=0.069). Overall model accuracy was 84.8% (Table V).

Table 4. Spearman correlation coefficients

	SIWB Tot	SIWB SE	SIWB LS	VCBS Tot	VAS Tot	VAS ID	VAS CA
SIWB Self-Efficacy	0.946***	-					
SIWB Life Scheme	0.890***	0.718***	-				
VCBS Total	-0.167*	-0.181*	-0.132	-			
VAS Total	0.235**	0.251**	0.157*	-0.344***	-		
VAS Individual Dev.	0.271***	0.293***	0.188*	-0.254**	0.942***	-	
VAS Community Adv.	0.153	0.153	0.103	-0.417***	0.875***	0.679***	-
Age	0.067	0.058	0.066	0.009	0.000	-0.015	0.033
Number of children	-0.153	-0.210**	-0.071	0.082	-0.066	-0.076	-0.060

*Spearman correlation. SE: Self-Efficacy; LS: Life Scheme; ID: Individual Development; CA: Community Advocacy. *p<0.05, **p<0.01, ***p<0.001.*

Table 5. Predictors of vaccine refusal (binary logistic regression)

Variable	B	SE	Wald	OR	95% CI	P
Age	-0.064	0.045	2.022	0.938	0.859–1.024	0.155
Education (university)	0.258	0.567	0.206	1.294	0.426–3.931	0.650
Employment status	-0.311	0.569	0.299	0.733	0.240–2.233	0.584
SIWB Total	0.048	0.030	2.506	1.049	0.989–1.114	0.114
VCBS Total	0.142	0.035	16.305	1.153	1.076–1.235	<0.001***
VAS Total	-0.061	0.033	3.312	0.941	0.882–1.005	0.069

*Dependent variable: Vaccine refusal (Yes=28, No=136). Pseudo R^2=0.213. Enter method. OR: Odds Ratio; CI: Confidence Interval. Model accuracy: 84.8%. *p<0.05, **p<0.01, ***p<0.001.*

Discussion

In this sample, 17.1% of parents had refused at least one vaccine, a figure that falls within the 5 to 23% range documented in Türkiye (7,8). The main reasons parents gave, disbelief in vaccine benefit (46.4%) and worry about side effects (32.1%), are consistent with international findings (2,6,14). More than half of the parents also held negative views about new vaccines, echoing reports that newer vaccines tend to be seen as less trustworthy than long-established ones (8,26). Previous research has shown that limited post-marketing surveillance data and increased media attention surrounding new vaccine introductions contribute to heightened parental uncertainty (9,26).

The weak but significant inverse relationship between spiritual well-being and vaccine-conspiracy beliefs (rs=-0.167, p=0.033) offers a perspective that has received limited attention. Earlier work on religion and hesitancy

has yielded contradictory results, with some studies linking religious belief to greater hesitancy (27) and others finding no association (28). As Koenig (29) points out, while religion typically involves organized community traditions and institutional identities, spirituality extends beyond these boundaries to include an individual's deeply personal search for the transcendent and ultimate truth. By assessing this broader, internalized dimension rather than mere denominational identity, our study captures specific internal coping resources. Our data are in line with this nuanced approach: the Self-Efficacy subscale correlated more strongly with both conspiracy beliefs and advocacy than the Life Scheme subscale, pointing to problem-solving confidence as the operative mechanism. Parents who feel capable of evaluating health information on their own may be less susceptible to conspiratorial narratives.

The relationship between conspiracy beliefs and vaccine advocacy merits closer examination. While the overall correlation was moderate (rs=-0.344), it was notably stronger for the Community Advocacy subscale (rs=-0.417) than for Individual Development (rs=-0.254). This gap suggests that parents who take an active role in encouraging vaccination among friends and neighbours hold more firmly resistant views against conspiracy claims, possibly because public commitment to a position reinforces that position psychologically. If this interpretation holds, public-health programmes that train parents as peer advocates could both increase vaccination uptake and reduce vulnerability to misinformation.

One of the more noteworthy observations was that conspiracy beliefs showed no association with education, income, age, or place of residence. A similar finding emerged in a large Chinese sample, where educational attainment bore no direct relation to vaccine hesitancy and the link between socioeconomic status and hesitancy followed a U-shaped curve mediated by social support and health literacy (15). These results challenge the assumption that hesitancy is simply a matter of insufficient knowledge. Rather, conspiratorial thinking appears to have deeper cognitive and emotional roots that standard demographic indicators do not capture. Geographic clustering of parental hesitancy may further reinforce these beliefs through local social networks (30).

In the logistic regression model, vaccine-conspiracy beliefs emerged as the sole significant predictor of actual refusal (OR=1.153, p<0.001), while vaccine advocacy approached but did not reach significance (OR=0.941, p=0.069). This pattern suggests that negative beliefs carry greater behavioural weight than positive attitudes, which has practical relevance for intervention design: efforts to reduce conspiratorial thinking may be more effective than simply promoting positive vaccine messages.

Employed parents reported higher spiritual well-being scores (p=0.032), which may reflect the contribution of occupational engagement to perceived self-efficacy. The inverse association between number of children and self-efficacy (rs=-0.210) further supports the view that accumulated caregiving demands can weaken confidence in managing health-related decisions.

Limitations

The cross-sectional design precludes causal inference. Data were collected from a single centre, limiting generalizability. The self-report format may have introduced social-desirability bias. The relatively low number of refusers (n=28) limits the statistical power of the logistic regression.

Conclusion

This study found significant correlation among spiritual well-being, vaccine hesitancy, and vaccine advocacy. Parents with higher spiritual well-being showed lower vaccine hesitancy and greater vaccine advocacy. Vaccine hesitancy was independent of education level, affected all sociodemographic groups, and was the strongest predictor of vaccine refusal. The strong negative association between Community Advocacy and vaccine hesitancy points to the importance of training parents as active vaccine advocates within their communities, rather than focusing only on individual information delivery. Longitudinal designs are needed to clarify causal relationships, and intervention programmes aimed at strengthening vaccine advocacy should be developed.

Declarations

Funding

This research received no external funding.

Conflict of Interest

The authors declare no conflict of interest.

Ethics Approval

Ethical approval was obtained from the Health Sciences Research Ethics Committee of Sivas Cumhuriyet University (Decision No: 2025-12/23, dated 11.12.2025). Institutional permission was obtained (Document No: E-93596471-010.01-664530, dated 16.01.2026). Written informed consent was obtained from all participants. The study was conducted in accordance with the Declaration of Helsinki and the Good Clinical Practice Guidelines.

Availability of Data and Material

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Authors' Contributions

Conceptualization and study design: E.A.G., N.K. Data collection: N.K. Introduction and literature review: N.K. Statistical analysis and interpretation of data: E.A.G. Results and discussion writing: E.A.G. Manuscript drafting and critical revisions: E.A.G., N.K. All authors read and approved the final manuscript.

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