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THE CONTRIBUTIONS OF FAMILY EDUCATION AND THE PESANTREN ENVIRONMENT TO SANTRI'S SENSE OF RESPONSIBILITY

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ABSTRAK

Pendidikan karakter, khususnya pengembangan rasa tanggung jawab pada remaja, merupakan perhatian penting dalam pendidikan Islam. Penelitian kuantitatif korelasional ini mengkaji hubungan pendidikan keluarga dan lingkungan pesantren dengan rasa tanggung jawab santri di Pondok Pesantren Nur Khodijah 3 Tahsin Tahfidz, Denanyar, Jombang. Dengan teknik total sampling, penelitian melibatkan seluruh 90 santri. Data dikumpulkan melalui kuesioner Likert lima poin yang terdiri atas 30 butir, serta dilengkapi wawancara, observasi, dan dokumentasi. Data dianalisis menggunakan regresi linear sederhana dan berganda dengan SPSS 31.0. Dalam model regresi berganda, lingkungan pesantren berhubungan positif dan signifikan dengan rasa tanggung jawab ($B = 0{,}421$; $\beta = 0{,}357$; $p < 0{,}001$), sedangkan pendidikan keluarga tidak signifikan secara statistik ($B = 0{,}133$; $\beta = 0{,}118$; $p = 0{,}238$). Model menjelaskan 15,4% varians rasa tanggung jawab ($R^2 = 0{,}154$; R^2 terkoreksi = 0,134; $F(2, 87) = 7{,}896$; $p < 0{,}001$). Meskipun estimasi koefisien terstandarisasi lingkungan pesantren lebih besar, perbedaan kedua koefisien tersebut tidak signifikan secara statistik ($t(87) = 1{,}59$; $p = 0{,}12$). Temuan ini menunjukkan hubungan kontribusi bersama dalam model aditif, bukan bukti adanya efek sinergis. Hasil penelitian juga menegaskan perlunya penelitian lanjutan mengenai keterkaitan lingkungan keluarga dan pesantren dalam pengembangan tanggung jawab santri.

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Keywords:
Family Education; Pesantren Environment; Sense of Responsibility; Character Education; Santri

ABSTRACT

Character education, particularly the development of responsibility among adolescents, is an important concern in Islamic education. This quantitative correlational study examined the relationships of family education and the pesantren environment with santri's sense of responsibility at Nur Khodijah 3 Tahsin Tahfidz Islamic Boarding School, Denanyar, Jombang. Using total sampling, the study involved all 90 santri. Data were collected through a 30-item five-point Likert questionnaire, supplemented by interviews, observations, and documentation, and analyzed using simple and multiple linear regression in SPSS 31.0. In the multiple regression model, the pesantren environment was positively and significantly associated with responsibility ($B = 0.421$, $\beta = 0.357$, $p < 0.001$), whereas family education was not statistically significant ($B = 0.133$, $\beta = 0.118$, $p = 0.238$). The model explained 15.4% of the variance in responsibility ($R^2 = 0.154$; adjusted $R^2 = 0.134$; $F(2, 87) = 7.896$, $p < 0.001$). Although the estimated standardized coefficient for the pesantren environment was larger, the difference between the two coefficients was not statistically significant ($t(87) = 1.59$, $p = 0.12$). These findings indicate a significant joint association in an additive model rather than a demonstrated synergistic effect. The findings also highlight the need for further research on how family and pesantren educational contexts relate to santri's responsibility.

A. INTRODUCTION

Character education has become a key priority in human resource development in the era of globalization. Advances in information technology and shifts in social interaction present new challenges in shaping the character of the younger generation. Several authors describe a declining trend in discipline, responsibility, social concern, and ethics among adolescents (Setyawan, 2025). Such accounts are largely conceptual or based on local observations, and systematic measurement of adolescents' responsibility remains limited, so empirical studies at the level of educational environments are needed. Youth aged 16–30 make up roughly 23–24% of Indonesia's population (Badan Pusat Statistik, 2024); instilling character values, particularly responsibility, is therefore a strategic concern for sustainable national development.

Responsibility occupies a central position in character formation. From an Islamic educational perspective it concerns not only academic duties but also worship, adherence to rules, safeguarding trusts, and social contribution (Rochmah, 2016). In this study, a sense of responsibility means the self-reported readiness of santri (students of a pesantren, an Islamic boarding school) to fulfill their obligations toward themselves, their duties, and the pesantren's rules. Its internalization is said to be challenged by intensive digital media use, changing social interaction, and weaker parental supervision (AlFadhil, 2021). These are plausible risk factors rather than established causes, and pesantren respond with explicit regulation, such as rules on gadget use (Arifin et al., 2025). How the conditions of pesantren life and family upbringing relate to santri's responsibility needs empirical examination.

This study draws on two theoretical foundations. The first is Ki Hajar Dewantara's Three Centers of Education (*Tri Pusat Pendidikan*): the family (*alam keluarga*), the educational institution (*alam perguruan*), and the youth movement or wider society (*alam pergerakan pemuda*), which should work together (Dewantara, 1977). In a residential pesantren these centers must be distinguished. The family is the

first source of values, but its everyday presence is reduced because santri live in dormitories. The pesantren combines features of an educational institution (instruction, curriculum, and rules) with those of a surrogate family, because the kiai (pesantren leader) and caregivers (*pengasuh*) act *in loco parentis*. The wider community, such as the surrounding village and alumni networks, is the third center; this study does not measure it.

The second foundation is Abdullah Nashih Ulwan's Islamic character education, which proposes five methods: exemplary behavior (*qudwah* or *uswah hasanah*), habituation (*'adah*), counsel (*mau'izhah*), supervision (*mulahazhah*), and sanctions (*'uqubah*) (Ulwan, 2012). Family education (X_1) corresponds to parental modeling, counsel, supervision, and habituation at home; the pesantren environment (X_2) to the supervision, sanction, and habituation embedded in daily pesantren routines; and sense of responsibility (Y) to the behavioral outcome. These links are conceptual; the instrument does not measure the five methods separately.

Research on family education may examine (a) parents' educational practices as reported by parents, (b) children's perceptions of the family education they received, or (c) the continuity of values between home and institution. These are related but distinct. This study addresses the second: family education is measured through santri's perceptions of parental modeling, guidance, communication, and religious practice. Parents' reports and value continuity were not measured.

The family is the first and primary educational environment; parents provide guidance, supervision, habituation, and example from an early age (Sudirman, 2025). M. Wahid Abdullah et al., (2025) report that the intensity of parental communication is related to santri's resilience in adjusting to pesantren life, and Fatima, (2026) found that rewarding parenting was positively linked to self-regulation and social competence among 349 adolescents aged 12–17.

Pesantren, in turn, are not only institutions for transferring religious knowledge but also spaces for moral cultivation through a 24-hour living system (Hanum, 2022). Santri manage their time with discipline, follow rules, carry out tasks independently, and fulfill religious and academic obligations, routines widely regarded as opportunities to practice responsibility.

Several authors argue that character internalization is more effective when the values taught at home are consistent with those practiced in the pesantren (Lestari, 2016). This idea is often expressed as "synergy" between family and pesantren. In a statistical sense, however, synergy implies an interaction: the association of one environment with responsibility depends on the level of the other (Aiken & West, 1991). This study does not test such an interaction; it examines separate and joint contributions in an additive model, so "synergy" is used only for the theoretical rationale and not as a finding.

Recent studies approach santri's responsibility from several angles. Amal Hidayat Ahmad, (2023) show that it develops through habit formation, modeling, supervision, and task assignment, and Hasanudin & Junaidi, (2026) report that management practices such as night roll calls and point systems shape discipline and responsibility. Rahayu & Bahri, (2025) find that discipline and independence are cultivated through educational sanctions, although family background and the surrounding environment shape the results. In a quantitative study of 137 female students, Firdausi et al., (2025) found that holistic education relates to moral

excellence through spiritual discipline. Studies of the family side are scarcer: Jahidin et al., (2024) report that santri perceive pesantren parenting mainly through communication, and Hermawan, (2025) found parental involvement to be the least satisfactory element of a pesantren character program.

Nevertheless, these studies mostly examine either the family or the pesantren, and most are descriptive or qualitative, so they say little about how the two environments relate to responsibility within the same analysis or about the size of each contribution. Whether one environment shows a stronger association than the other in a residential pesantren has not been established empirically.

Combining two established variables in one regression model is a modest contribution by itself. This study adds understanding in three specific ways. First, it examines a residential *tahfidz* (Qur'an memorization) pesantren, where the family's everyday presence is limited by design. Second, it reports unique and shared contributions, standardized coefficients, and confidence intervals rather than separate R^2 values only, so that relative contributions are judged within one model. Third, it separates simultaneous contribution from synergistic interaction, two ideas that are easily conflated, and it discusses construct overlap and measurement quality openly.

The study aims to (1) analyze the relationship between family education and santri's sense of responsibility, (2) analyze the relationship between the pesantren environment and santri's sense of responsibility, and (3) test their joint and relative contributions in one multiple regression model. Three hypotheses were tested: H_1, family education is positively and significantly related to santri's sense of responsibility; H_2, the pesantren environment is positively and significantly related to it; and H_3, the two variables jointly contribute significantly to it. The findings are expected to clarify what correlational evidence can say about the roles of different educational environments and to inform pesantren administrators and parents in designing character-building programs.

B. METHOD

This study employed a quantitative correlational design to examine the relationships between family education, the pesantren environment, and santri's sense of responsibility. The research was conducted at Nur Khodijah 3 Tahsin Tahfidz Islamic Boarding School in Denanyar, Jombang, from April to June 2026 (Sugiyono, 2011). A cross-sectional approach was used, meaning that data were collected during one period. Accordingly, the findings identify statistical associations among the variables and do not establish causal relationships.

Population and sampling. The population comprised all 90 santri enrolled at the pesantren. Given the relatively small population, total sampling was applied, whereby every member of the accessible population was included. All 90 santri completed the questionnaire, resulting in a 100% response rate. No random selection was conducted because the study included the entire accessible population at the research site.

Variables and operational definitions. Family education (X_1) was operationalized as santri's perceptions of the educational practices and values received from their families. It was measured through four indicators: emulating parental values, behaving in accordance with family guidance and upbringing, communicating with family members, and applying religious values in daily life at home. Because santri live away from home, this variable reflects their perceptions of family education received before and during their stay, rather than direct measurements of parents' current practices.

The pesantren environment (X_2) referred to santri's perceptions of the structured conditions and educational demands of pesantren life, measured through adaptation to the environment, compliance with institutional rules, and disciplined participation in activities (Hanum, 2022). Sense of responsibility (Y) referred to santri's self-reported readiness to fulfill obligations toward themselves, carry out assigned duties, and comply with pesantren rules (Rochmah, 2016). All variables were self-reported, and their indicators operationalized the family- and pesantren-level educational methods discussed by Ulwan, (2012) in the Introduction.

Construct overlap. Rule compliance and disciplined participation in X_2 are conceptually close to discipline in following rules in Y, which may inflate their association. The constructs are intended to differ: X_2 describes santri's perceptions of institutional conditions, expectations, and opportunities for participation, whereas Y describes their perceived personal obligations and readiness to fulfill them, including responsibilities toward themselves that are not limited to institutional rule enforcement. Formal discriminant validity testing was not conducted; the possibility of construct overlap is therefore acknowledged as a limitation.

Instrument. Data were collected using a closed-ended questionnaire consisting of 30 items, with 10 items assigned to each variable. Responses were recorded on a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). The instrument matrix, including the indicators and item distribution, is presented in Table 1.

Table 1. Research Instrument Matrix

Variable	Indicator	Item No.	Number of Items
Family Education, as Perceived by Santri (X_1)	Able to emulate the values taught by parents	1, 2, 3	3
	Able to behave in accordance with the family's guidance and upbringing	4, 5	2
	Able to communicate well with family members	6, 7, 8	3
	Able to apply religious values in daily life at home	9, 10	2
Pesantren Environment, as Perceived by Santri (X_2)	Ability to adapt to the Islamic boarding school environment	1, 2, 3, 4	4
	Able to obey the rules in effect at the Islamic boarding school	5, 6, 7	3
	Participate in boarding school activities with discipline	8, 9, 10	3
Santri's Sense of Responsibility (Y)	Fulfilling responsibilities toward oneself	1, 2, 3, 4	4
	Carrying out duties and obligations at the Islamic boarding school	5, 6, 7	3
	Being disciplined in following the boarding school rules	8, 9, 10	3
Total			30

Source: Research instrument (2026)

Validity and reliability. The questionnaire was piloted with 30 santri who were not included in the main study sample. Item validity was examined using Pearson's product–moment item–total correlation. The critical correlation value was 0.361 (df = 28, α = 0.05, two-tailed), and items exceeding this value were retained. Internal

consistency was assessed using Cronbach's alpha. Following the guidance cited in Hair et al., (2019), values of 0.70 or higher were considered acceptable, whereas values between 0.60 and 0.70 were treated as marginal and interpreted cautiously. The pilot-test results are reported in the Findings section.

Supplementary data. Interviews, structured observations, and document reviews were conducted to provide contextual information about the pesantren setting. Four institutional informants were interviewed: the head caregiver, the chief administrative officer, and two senior dormitory mentors. The interviews addressed institutional policies, character-building routines, disciplinary practices, and communication with parents. Structured observations covered approximately 24 hours over four weeks, from 4 to 31 May 2026. Documents reviewed included the institutional statute, daily activity schedules, the dormitory code of conduct, and attendance registers. These sources contextualized the quantitative findings; they were not treated as an independent qualitative dataset and were not included in statistical hypothesis testing.

Research ethics. Ethical clearance for data collection was granted by the pesantren leadership. Participation was voluntary, and all participants were informed of the study's purpose and of their right to withdraw without penalty. Respondents aged 18 gave written informed consent themselves. Because 42 respondents (46.7%) were under 18, written consent for them was given by the caregivers acting *in loco parentis*, with prior notification to parents or guardians. This procedure is justified because santri live in the pesantren under the caregivers' day-to-day responsibility and because the risk was minimal: an anonymous questionnaire on everyday experiences without sensitive personal data. Data were anonymized, stored securely, and accessible only to the research team, in line with general ethical principles for research with children (Association, 2024).

Data analysis. Data were analyzed using SPSS version 31.0 (Ghozali, 2021). Descriptive statistics were calculated, and total scores were classified using equal-interval criteria across the theoretical range of 10–50: low (10–23), moderate (24–36), and high (37–50), equivalent to mean item scores of 1.00–2.33, 2.34–3.67, and 3.68–5.00. Residual normality was assessed using a normal probability plot, the Kolmogorov–Smirnov test, and the Shapiro–Wilk test, with the latter serving as the principal statistical reference. Multicollinearity was assessed using Tolerance and the Variance Inflation Factor (VIF), while heteroscedasticity was examined using the Glejser test. H_1 and H_2 were examined using simple linear regression, and H_3 was examined using multiple linear regression at $\alpha = 0.05$. Results are reported using unstandardized (B) and standardized (β) coefficients, standard errors (SE), t-values, p-values, 95% confidence intervals (CI), R^2, adjusted R^2, and the overall F-test. Relative contributions were evaluated within the same multiple regression model using β and squared semi-partial correlations (sr^2). A direct test comparing the standardized coefficients was also conducted, taking the covariance between the estimates into account. The model is additive and contains no interaction term ($X_1 \times X_2$); therefore, statistical synergy was not tested (Aiken & West, 1991). Figure 1 summarizes the procedure.

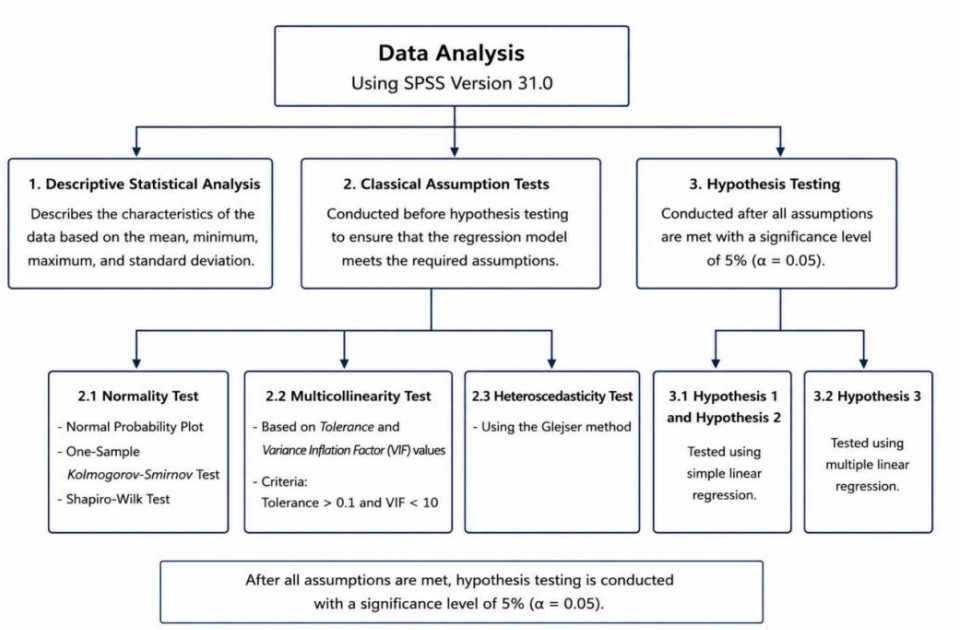


Figure 1. Data Analysis Techniques

C. RESULT AND DISCUSSION

Findings

1. Respondent Characteristics and Instrument Quality

All 90 santri completed the questionnaire, resulting in a 100% response rate. All respondents were female, reflecting the characteristics of the pesantren as a girls' boarding institution. Their ages ranged from 13 to 18 years: 42 respondents (46.7%) were under 18, while 48 (53.3%) were 18 years old. Length of stay ranged from one to five years (M = 2.4, SD = 1.1), indicating that all participants had prior experience of residential pesantren life.

In the pilot test (n = 30), all 30 items exceeded the critical Pearson correlation value of 0.361 and were therefore retained. The reported item–total correlation ranges were 0.382–0.614 for family education, 0.412–0.685 for the pesantren environment, and 0.445–0.720 for sense of responsibility (Table 2). Cronbach's alpha coefficients were 0.628, 0.724, and 0.782, respectively. Thus, the pesantren environment and responsibility scales met the conventional 0.70 threshold, whereas the family education scale showed marginal internal consistency. For family education, corrected item–total correlations ranged from 0.315 to 0.482, while alpha-if-item-deleted values ranged from 0.584 to 0.621. Because none of the item-deleted alpha values exceeded the overall alpha of 0.628, removing an individual item would not have improved the scale's internal consistency. All 10 items were therefore retained to preserve coverage of the four indicators. Nevertheless, the marginal reliability of the family education scale should be considered when interpreting its regression coefficient, because measurement error may attenuate observed associations.

Table 2. Instrument Validity and Reliability (Pilot Sample, n = 30)

Scale	Items	Item–total r (range)	Cronbach's α	Interpretation
Family education (X_1)	10	0.382–0.614	0.628	Marginal
Pesantren environment (X_2)	10	0.412–0.685	0.724	Acceptable
Sense of responsibility (Y)	10	0.445–0.720	0.782	Acceptable

Note. Critical r = 0.361 (df = 28, α = 0.05, two-tailed). The item–total ranges in the table are reported separately from the corrected item–total correlation for X_1 (0.315–0.482).

2. Descriptive Statistics

Table 3 presents the descriptive statistics. Based on the classification criteria described in the Method section, all three variables fell within the moderate category. Family education had a mean score of 32.8 (SD = 2.826), the pesantren environment had a mean score of 32.2 (SD = 2.691), and sense of responsibility had a mean score of 31.9 (SD = 3.172). These values corresponded to mean item scores of 3.28, 3.22, and 3.19, respectively. None of the variables reached the high category. The observed score ranges were relatively narrow compared with the possible range of 10–50, indicating limited variability in this sample.

Table 3. Descriptive Statistics of Research Variables

Variable	Mean	SD	Min.	Max.	Mean per item	Category	Positive responses, n (%)
Family education (X_1)	32.8	2.826	26	41	3.28	Moderate	560 (62.2%)
Pesantren environment (X_2)	32.2	2.691	27	41	3.22	Moderate	620 (68.9%)
Sense of responsibility (Y)	31.9	3.172	23	45	3.19	Moderate	590 (65.6%)

Note. Theoretical range = 10–50; categories: low = 10–23, moderate = 24–36, high = 37–50. Positive responses = agree + strongly agree among 900 item responses per variable (90 respondents × 10 items).

Positive responses, defined as "agree" and "strongly agree," accounted for 62.2% of the 900 item-level responses for family education, 68.9% for the pesantren environment, and 65.6% for sense of responsibility. These percentages represent aggregated questionnaire responses rather than the proportion of respondents classified into a particular category. Overall, the findings indicate moderately favorable self-reported perceptions across the three measured variables.

Because no variable reached the high category, the descriptive results do not support describing family education, the pesantren environment, or sense of responsibility as high in this sample. The scores were therefore analyzed as continuous variables in the regression models, and the categories serve only to describe the level of each variable.

3. Classical Assumption Tests

Before hypothesis testing, the regression assumptions were examined (Table 4). Residual normality was assessed using a normal probability plot and two statistical tests. The Kolmogorov–Smirnov test yielded p = 0.194, while the Shapiro–Wilk test yielded p = 0.087. Both values exceeded 0.05; therefore, the tests provided no evidence against the assumption of normally distributed residuals. The Shapiro–Wilk result was used as the principal statistical reference, while the probability plot served as a visual assessment. Tolerance (0.980) and VIF (1.020) indicated no evidence of problematic multicollinearity. The Glejser test yielded p = 0.136 for family education and p = 0.435

for the pesantren environment. As both values exceeded 0.05, there was no statistical evidence of heteroscedasticity. These diagnostic results supported proceeding with the regression analyses.

Table 4. Summary of Classical Assumption Test Results

Assumption	Test	Result	Criterion	Decision
Normality	Normal P-P plot (visual)	—	Points near the diagonal	Supporting evidence
	Kolmogorov-Smirnov	p = 0.194	p > 0.05	Normal
	Shapiro-Wilk (principal basis)	p = 0.087	p > 0.05	Normal
Multicollinearity	Tolerance	0.980	> 0.10	No multicollinearity
	VIF	1.020	< 10	No multicollinearity
Heteroscedasticity	Glejser: family education	p = 0.136	p > 0.05	Homoscedastic
	Glejser: pesantren environment	p = 0.435	p > 0.05	Homoscedastic

Source: Processed primary data, SPSS 31.0 (2026)

4. Correlations and Distinctness of the Constructs

Table 5 presents the zero-order correlations. Family education correlated weakly and not significantly with sense of responsibility (r = 0.169, p = 0.110; 2.9% shared variance), whereas the pesantren environment correlated moderately and significantly (r = 0.374, p < 0.001; 14.0% shared variance). The correlation between the two predictors was weak (r ≈ 0.14, 2.0% shared variance, as implied by Tolerance = 0.980). The moderate size of the correlation between the pesantren environment and responsibility is relevant to the construct-overlap concern raised in the Method: if the two scales largely measured the same content, a much higher correlation would be expected, and 86.0% of the variance in responsibility is not shared with the pesantren environment scale. This is indirect evidence only, because overlapping items can raise a correlation without making it large.

Table 5. Zero-Order Correlations Among Research Variables

Pair of variables	r	Shared variance (r^2)	p
Family education (X_1) – Sense of responsibility (Y)	0.169	0.029	0.110
Pesantren environment (X_2) – Sense of responsibility (Y)	0.374	0.140	< 0.001
Family education (X_1) – Pesantren environment (X_2)	≈ 0.14	≈ 0.020	≈ 0.19

Note. The X_1–X_2 correlation is derived from Tolerance ($1 - r^2 = 0.980$).

5. Hypothesis Testing

Hypotheses were tested at α = 0.05 (two-tailed), using the t test for each coefficient and the F test for the overall model. Because the assumptions reported above were met, the ordinary least squares estimates and the standard errors reported below can be interpreted in the usual way.

Simple regression (H_1 and H_2). Family education accounted for only 2.9% of the variance in sense of responsibility (R^2 = 0.029; B = 0.190, SE = 0.118, β = 0.169, t = 1.613, p = 0.110), and the 95% confidence interval of B included zero, so H_1 is not supported.

The pesantren environment accounted for 14.0% (R^2 = 0.140; B = 0.441, SE = 0.117, β = 0.374, t = 3.781, p < 0.001), so H_2 is supported (Table 6).

Table 6. Simple Linear Regression Results (H_1 and H_2)

Hypothesis and predictor	B	SE	β	t	p	95% CI for B	R^2	Decision
H_1: Family education (X_1)	0.190	0.118	0.169	1.613	0.110	−0.044, 0.424	0.029	Not supported
H_2: Pesantren environment (X_2)	0.441	0.117	0.374	3.781	< 0.001	0.209, 0.673	0.140	Supported

Note. Dependent variable: sense of responsibility (Y). B = unstandardized coefficient; SE = standard error of B; β = standardized coefficient; CI = confidence interval.

Multiple regression (H_3). The multiple regression analysis indicated that family education and the pesantren environment were jointly and significantly associated with santri's sense of responsibility, F(2, 87) = 7.896, p < 0.001. The model produced R = 0.392, R^2 = 0.154, and adjusted R^2 = 0.134, indicating that the two predictors jointly accounted for 15.4% of the variance in responsibility; the remaining 84.6% was not explained by the predictors included in this model. When both predictors were entered simultaneously, the pesantren environment was positively and significantly associated with responsibility (B = 0.421, SE = 0.117, β = 0.357, t = 3.586, p < 0.001, 95% CI [0.188, 0.655]). In contrast, family education was not statistically significant (B = 0.133, SE = 0.112, β = 0.118, t = 1.189, p = 0.238, 95% CI [−0.089, 0.355]). H_3 is supported in terms of the significant joint association of the predictors. This is an additive model rather than a test of interaction, and the regression equation is $\hat{Y} = 13.979 + 0.133X_1 + 0.421X_2$.

Table 7. Multiple Linear Regression Results (H_3)

Predictor	B	SE B	β	t	p	95% CI for B	sr^2
Constant	13.979	4.892	—	2.858	0.005	4.256, 23.702	—
Family education (X_1)	0.133	0.112	0.118	1.189	0.238	−0.089, 0.355	0.014
Pesantren environment (X_2)	0.421	0.117	0.357	3.586	< 0.001	0.188, 0.655	0.125

Note. Dependent variable: sense of responsibility (Y). Model: R = 0.392, R^2 = 0.154, adjusted R^2 = 0.134, F(2, 87) = 7.896, p < 0.001. CI = confidence interval; sr^2 = squared semi-partial correlation (unique share of variance in Y).

Model fit and prediction. The ANOVA results (Table 8) show that the regression model accounts for 137.57 of the 895.48 total sum of squares (15.4%), with a mean square of 68.79 against a residual mean square of 8.71. The standard error of the estimate (2.95 points) is only slightly smaller than the standard deviation of responsibility (3.17 points), so knowing a santri's scores on the two predictors improves the prediction of her responsibility score only modestly.

Table 8. Analysis of Variance of the Multiple Regression Model

Source	Sum of squares	df	Mean square	F	p
Regression	137.57	2	68.79	7.896	< 0.001
Residual	757.91	87	8.71	—	—
Total	895.48	89	—	—	—

Source: Processed primary data, SPSS 31.0 (2026)

Relative contributions. The standardized coefficient for the pesantren environment ($\beta = 0.357$) was larger than that for family education ($\beta = 0.118$). The squared semi-partial correlations indicated that the pesantren environment uniquely accounted for 12.5% of the variance in responsibility, whereas family education uniquely accounted for 1.4%; approximately 1.5% of the variance explained by the overall model was shared between the predictors. These estimates suggest that the pesantren environment had a larger estimated association with responsibility in this sample. However, a larger coefficient does not by itself establish a statistically significant difference between predictors. The reported direct comparison of the standardized coefficients yielded a difference of 0.24 (SE = 0.15), $t(87) = 1.59$, $p = 0.12$. Thus, the difference was not statistically significant at the 0.05 level. The results do not establish that the pesantren environment had a statistically stronger association with responsibility than family education; rather, it was the only predictor that reached statistical significance in the joint regression model. The comparison was based on coefficients estimated within the same multiple regression model, rather than on separate R^2 values from the simple regression analyses. Standardized coefficients indicate estimated associations in standard-deviation units, whereas squared semi-partial correlations represent each predictor's unique contribution to the explained variance.

Simple versus multiple regression. The unstandardized coefficient of family education fell from 0.190 in the simple model to 0.133 in the multiple model (a reduction of about 30%), because the two predictors share about 2% of their variance and part of the simple association of family education runs through the pesantren environment. The coefficient of the pesantren environment changed little (0.441 to 0.421, a reduction of about 5%). Adjusted R^2 (0.134) is close to R^2 (0.154), which indicates little shrinkage, and the ratio of 45 cases per predictor exceeds common rules of thumb for multiple regression.

Practical interpretation. Holding family education constant, a santri whose pesantren environment score is one standard deviation higher (2.69 points) is predicted to score 1.13 points higher on responsibility (0.36 SD of Y). The corresponding difference for family education (one SD = 2.83 points) is 0.38 points (0.12 SD of Y), and it cannot be distinguished statistically from zero.

Effect sizes and precision. The overall regression model explained 15.4% of the variance in santri's sense of responsibility, corresponding to an f^2 effect size of approximately 0.18. Based on the squared semi-partial correlations, the unique contribution of the pesantren environment corresponded to an f^2 value of approximately 0.15, whereas that of family education was approximately 0.02. These estimates indicate different observed contributions within the sample. Nevertheless, the relatively small sample and the marginal reliability of the family education scale warrant caution when interpreting its non-significant coefficient. The absence of statistical significance should not be interpreted as evidence that family education has no educational importance or no possible relationship with responsibility.

Summary. Using $\alpha = 0.05$, H_1 was not supported ($p = 0.110$), H_2 was supported ($p < 0.001$), and H_3 was supported (F-test $p < 0.001$). The pesantren environment is the only significant predictor in the joint model, and the two predictors together leave most of the variance in responsibility unexplained. The findings describe associations

in a single, all-female sample and do not show that either environment causes responsibility or that the two environments act synergistically.

6. Pesantren Context from Supplementary Sources

The supplementary sources describe the setting to which santri's ratings refer; they are not results of a separate qualitative analysis. Structured observation covered the daily routines of the pesantren, including morning and evening Qur'anic recitation, communal meals, prayer assemblies, and evening study sessions. The four informants (the head caregiver, the chief administrative officer, and two senior dormitory mentors) were asked about institutional policies, character-building routines, disciplinary enforcement, and communication with parents, and the documents reviewed (statute, daily schedules, dormitory code of conduct, and attendance registers) show that rules and schedules are formalized and recorded. This picture of a regulated, routinized environment is consistent with the way the pesantren environment was operationalized (adaptation, rule compliance, and disciplined participation), but it does not by itself test the quantitative relationships reported above.

Discussion

1. Family Education and Santri's Sense of Responsibility

Family education was positively but not significantly related to responsibility, both alone ($\beta = 0.169$, $p = 0.110$) and with the pesantren environment controlled ($\beta = 0.118$, $p = 0.238$). This is best read as a small, imprecisely estimated association rather than no association: the 95% confidence interval of β (−0.080 to 0.317) includes zero but also moderate positive values, and the study could detect only correlations of about 0.29 or larger. Non-significance therefore does not mean that family education is unimportant; statistical significance depends on sample size and measurement precision, which is different from educational importance.

Four explanations are possible, none of them demonstrated by these data. First, santri spend most of their time in the pesantren (Hanum, 2022), so the family's day-to-day role may be less visible, although time use and contact with parents were not measured. Second, family education scores varied little (SD = 2.826; observed range 26–41 of a possible 10–50), and restricted variability lowers correlations. Third, the scale's modest reliability ($\alpha = 0.628$) attenuates correlations, and santri's perceptions may differ from parents' actual practices. Fourth, family influence may operate indirectly, for example through religious motivation, readiness to accept rules, or adaptation to boarding life, as the link between parental communication and santri's resilience suggests (M. Wahid Abdullah et al., 2025). A model of direct associations cannot capture such pathways; future studies should use parent-reported data and mediation analysis.

The result does not contradict studies that stress the family's role. Fatima, (2026) found rewarding parenting linked to adolescents' self-regulation, and Hermawan, (2025) found parental involvement to be the weakest element of a pesantren character program, which is consistent with a family role that is valued but weakly integrated with the pesantren. Jahidin et al., (2024) add that communication is central to how santri experience pesantren parenting. Whether the association would be stronger among students living with their parents cannot be answered here, because no such group was studied. In terms of Dewantara, (1977) Three Centers, the result suggests that centers may relate differently to an outcome depending on

context; it cannot confirm that they work in synergy, because cooperation between the centers and the third center (the community) were not measured.

2. The Pesantren Environment and Santri's Sense of Responsibility

The pesantren environment was positively and significantly related to responsibility alone ($\beta = 0.374$, $p < 0.001$) and with family education controlled ($\beta = 0.357$, $p < 0.001$), uniquely accounting for 12.5% of the variance, a small-to-medium effect by Cohen, (1988) benchmark. This agrees with studies showing that responsibility and discipline develop through systematic habituation, modeling, supervision, and sanctions in pesantren (Ahmad & Agustang, 2023; Bakhri, 2020; Hasanudin & Junaidi, 2026; Rahayu & Bahri, 2025; Ubaidillah & Ashari, 2023). Firdausi et al., (2025) likewise found, quantitatively, that Islamic boarding school education relates to moral excellence through spiritual discipline, and Hidayat & Nur Hidayat, (2024) and Sobon et al., (2025) describe exemplary behavior and dormitory-based routines as strengthening discipline, independence, and responsibility. Most of these studies are qualitative; the present study adds a quantitative estimate of the association, though not of its direction. The difference between its coefficient and that of family education was not significant ($t(87) = 1.59$, $p = 0.12$), so the claim of a stronger contribution should be held tentatively.

A plausible interpretation is that structured routines (congregational prayer, Qur'anic learning, dormitory management, and communal service) give santri repeated practice in responsibility, and that supervision, habituation, exemplary behavior, and sanctions operate consistently there (Ulwan, 2012). This rests on the literature and on the institutional documents and observations, not on measures of time spent in particular activities.

Three caveats apply. First, the pesantren environment and responsibility scales share content on rule compliance and discipline, so part of the association may reflect overlapping items, and the true association could be smaller than $r = 0.374$. Second, the design is correlational: santri who are already more responsible may perceive the environment more favorably or participate more actively. Third, both variables were self-reported by the same respondents, which can inflate the association through common-method bias. The finding is best stated as an association between santri's perceived pesantren environment and their self-reported responsibility, not as evidence of what the pesantren produces. If the association does reflect a genuine influence, strengthening responsibility could extend beyond institutional discipline to mentoring, leadership development, reflective learning, and counseling, as discussed by Sari et al., (2025).

3. Joint Contribution: Simultaneous Influence Versus Synergy

The two predictors jointly account for a significant share of the variance in responsibility ($F(2, 87) = 7.896$, $p < 0.001$; $R^2 = 0.154$; adjusted $R^2 = 0.134$). This is evidence of a simultaneous contribution, not of synergy. A significant F test indicates only that the predictors together explain more variance than expected by chance; it does not show that they reinforce one another. The joint result is also carried mainly by the pesantren environment, because family education was not significant once the other predictor was controlled.

In a regression framework, synergy implies an interaction: the association of one predictor with responsibility would be stronger or weaker at higher levels of the other, which is tested by adding a product term $X_1 \times X_2$ (Aiken & West, 1991). The

model tested here is additive and contains no such term. The unique contributions of family education (1.4%) and the pesantren environment (12.5%) and their shared variance (1.5%) sum to 15.4%; the small shared portion reflects the weak correlation between the predictors ($r \approx 0.14$), not mutual reinforcement. Whether the pesantren environment is more strongly associated with responsibility when family education is also strong, as the idea of continuity of values between home and pesantren implies, remains open. Testing it would require a larger sample, because interaction effects are typically small and need more power than main effects.

These results are compatible with literature that stresses the complementary roles of family and institutional education (Ahmad & Agustang, 2023; Lestari, 2016; Rochmah, 2016), but they do not test complementarity directly. In terms of Dewantara's theory, the two centers differ in the strength of their association with responsibility in this setting; the findings do not show that they work collaboratively. Likewise, Ulwan's five methods are consistent with the interpretation that the pesantren offers them more systematically than the home does for these santri, but the study did not measure the methods separately.

The explanatory power of the model is modest. The predictors explain 15.4% of the variance (adjusted $R^2 = 13.4\%$) and leave 84.6% unexplained. Responsibility is multidimensional and probably depends on other determinants, such as religiosity, intrinsic motivation, self-regulation, emotional maturity, peer relationships, caregiver leadership, organizational culture, length of stay, and prior educational experiences, together with measurement error. Even where significant, the two environmental variables explain only a small part of why santri differ in responsibility. Practically, the findings point to regular communication between parents and caregivers and to the alignment of educational values between home and pesantren, alongside continued strengthening of the pesantren's supervision and mentoring. These recommendations rest on associations and theoretical rationale; the data do not show that they would raise responsibility.

CONCLUSION

This study examined the relationships of family education and the pesantren environment with santri's sense of responsibility in one residential pesantren ($N = 90$). Family education was positively but not significantly related to responsibility, whereas the pesantren environment was positively and significantly related to it, including when family education was taken into account ($\beta = 0.357$ versus $\beta = 0.118$). Together, the two variables accounted for 15.4% of the variance in responsibility (adjusted $R^2 = 13.4\%$). The pesantren environment therefore showed the larger estimated association and was the only significant predictor, but the difference between the two coefficients is not statistically significant ($p = 0.12$), so a stronger contribution of the pesantren environment is suggested rather than established. Because the design is correlational and no interaction between the two environments was tested, the findings show joint contributions, not synergy, and do not establish that either environment causes responsibility.

Theoretically, the findings illustrate that in a residential pesantren the family and the pesantren differ in how strongly they are associated with santri's responsibility, which is compatible with the view that the contribution of each educational center depends on the context and intensity of students' interaction with

it (Dewantara, 1977). Whether the centers reinforce each other remains to be tested. Practically, pesantren administrators and parents may consider integrated character-building programs, regular communication about santri's progress, and ongoing character evaluation, bearing in mind that these suggestions rest on associations.

The study has several limitations. It was conducted at a single, all-female pesantren with 90 respondents, which limits generalization and statistical power. All variables were self-reported at one point in time, which allows common-method bias and social desirability and does not permit inference about direction. Family education was measured through santri's perceptions and not parents' reports, and its scale had modest reliability ($\alpha = 0.628$). The pesantren environment and responsibility scales partly overlap in content. The interaction between the variables was not tested, the model explains only 15.4% of the variance, and the interviews, observations, and documentation served only as context. Consent for respondents under 18 was given by caregivers *in loco parentis* with notification to parents, not by written parental consent.

Future research should involve more pesantren and male santri, include parent-reported measures, test the family × pesantren interaction with adequate power, examine mediators and further determinants such as religiosity, intrinsic motivation, peer relationships, organizational culture, and caregiver leadership, and use longitudinal or mixed-method designs.

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Author Contributions:

Nadia Tri Indah Saraswati contributed to the conceptualization and design of the study, methodology development, validation, formal analysis, investigation, data curation, and manuscript drafting. Edi Safari contributed to the methodology, investigation, and data curation. M. Dzikrul Hakim Al Ghozali, the corresponding author, contributed to manuscript review and editing, research supervision, and visualization. Shinta Lestari Oktarini contributed to the investigation, data curation, and manuscript review. Ajat Sudrajat contributed to the methodology, formal analysis, and manuscript review. Padjrin contributed to the investigation, validation, and manuscript editing. All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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Data Availability:

The data supporting the findings of this study consist of anonymized item-level questionnaire responses (main sample, n = 90; pilot sample, n = 30) and the questionnaire. They are available from the corresponding author upon reasonable request. Interview, observation, and documentation materials are not shared publicly to protect the confidentiality of the pesantren and its santri, many of whom are minors.

Conflicts of Interest:

The authors declare no conflict of interest.

Disclaimer:

The views and findings expressed in this article are solely those of the authors and do not necessarily represent those of their institutions, the pesantren studied, or any funder.

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