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The Role of Family Routines and Practices on Academic Performance in Middle School

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Abstract: Family routines and practices are recognized as critical determinants of child development. Despite extensive research on the socio-emotional benefits of family routines for school readiness in various contexts, there remains limited empirical evidence directly linking these routines to academic performance. This is because a lot of existing literature has focused on younger children below 8 years. This study sought to address this gap by examining the role of family routines on academic performance among middle school students in informal settlements. The study involved 351 middle school students and their parents from informal settlements in Nairobi, Kenya. Family routines were assessed using a structured questionnaire adapted from the Family Routine Inventory (FRI) scale. Academic performance data were obtained from the most recent school examinations of each participating student across five subjects (English, Kiswahili, Mathematics, Science, and Social Studies) as percentage scores. Results show that routines related to basic needs provision were the strongest predictors of academic performance, followed by academic monitoring routines. Emotional support routines moderately contributed to academic outcomes, while routines related to family outings and bonding had a limited impact. The study recommends further exploration of context-specific family routines using longitudinal designs to identify long-term impacts.

Keywords: *Academic performance, family routine, informal settlement.*

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Introduction

According to Boyce et al. (1983), family routines are “observable, repetitive behaviours which involve two or more family members, and which occur with predictable regularity in the daily life of a family.” Family routines and practices are critical components of child growth and development (Ferretti & Bub, 2017). These components are widely recognised for their role in shaping children’s socio-emotional well-being (Alhuzimi, 2021; Evans et al., 2005; Selman et al., 2025) and readiness for formal schooling (Ferretti & Bub, 2017). Research over the past four decades has consistently shown that structured and predictable family routines significantly contribute to children’s emotional stability (Keane, 2023), behaviour regulation (Morgan et al., 2022), better executive functioning (Evans et al., 2005; Fiese et al., 2002), and overall developmental outcomes (Alhuzimi, 2021; Chu & Jhuo, 2023; Hayes & Watson, 2013). Simple daily tasks serve as informal learning experiences that contribute to a child’s language development, numeracy skills, and critical thinking (Dunst et al., 2014). These foundational studies underscore the importance of family routines, rituals, and practices in modelling a stable and supportive home environment that can shape the next generation. Academic performance is one such critical aspect in shaping the future of our children (Davis et al., 2014). Academic performance, however, is influenced by a complex interplay of individual, familial, and environmental factors (Derilo, 2024; Starr & Riemann, 2022).

Formal definition and measurement of family routines started with the development of the Family Routine Inventory (FRI) in the early 1980s (Boyce et al., 1983; Jensen et al., 1983). The FRI classified family routines into 10 general domains themed around morning and evening routines, regular mealtimes, structured bedtime, and reliable transportation to school. FRI’s measures of family routines reflect typical middle-to upper-class household contexts. The United Nations describes informal settlements as residential areas where housing units are constructed on land to which the occupants

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have no legal claim, or which they occupy illegally, or unplanned settlements where housing does not comply with current planning/building regulations. Informal settlements are characterized by inadequate access to basic services and high incidences of poor economic status (Simiyu et al., 2019). These characteristics pose unique challenges to families maintaining specific patterns of life (González de la Rocha, 2012; Tenneti, 2025). Families in informal settlements face significant structural constraints, making adherence to conventional routines challenging (Turnbull et al., 2022). Parents and caregivers in informal settings often experience financial hardships (Tenneti, 2025), time constraints, and limited access to learning resources (González de la Rocha, 2012). These dynamics often disrupt family routines and affect children's social-emotional experiences and school readiness (Ferretti & Bub, 2017).

Despite strong evidence linking family routines with children's socio-emotional and behavioural outcomes, there is limited empirical evidence on the direct association between family routines and academic performance. The existing literature (e.g., Dunst et al., 2014; Turnbull et al., 2022) has largely concentrated on early childhood (*below 8 years*). Studies such as Turnbull et al. (2022) have primarily investigated the association between family routines and readiness for formal schooling. However, the direct link between established family routines and measurable academic achievements remains underexplored. While existing work has established the importance of family routines for children's socio-emotional development and school readiness, less is known about how these routines translate into tangible academic outcomes as children progress through formal schooling. This gap is critical in contexts such as informal settlements, where socioeconomic constraints, unstable living conditions, and limited access to resources complicate the maintenance of consistent routines.

The Current Study

This study attempts to address this research gap by investigating the role of family routines and practices in shaping academic performance. The study focused on middle-level school students in formal settlements. The evidence presented in this study, therefore, accounts for the unique demographics of both household and student levels. This study sought to examine how the unique context and family practices within informal settlements influence educational outcomes. It is hoped that this work can contribute insight to broaden the scope of FRI and make it relevant within marginalized communities.

Research Question

- What is the association between family routines and practices and the academic performance of middle-level school students living in informal settlements?

Methodology

Research Design

This study employed a cross-sectional survey design to examine the role of family routines and practices on academic performance in middle school for students from informal settlements. A cross-sectional survey design allowed for the collection of data from a diverse group of participants at a single point in time to establish relationships between variables of interest. In this study our diverse group of participants was students on one side and their parents on the other side.

Sample and Data Collection

This study was part of a research project on the association between household characteristics, home environment, and academic performance of children in an informal settlement. The research project was licensed by the Kenya National Commission for Science, Technology and Innovation (NACOSTI), license number 794438/2023 in compliance with the Legal Notice No. 108 on Science, Technology and Innovation (Research Licensing) Regulations, 2014. This was in accordance with the ethical standard in the responsible conduct of research in the Republic of Kenya. In this project, 351 grade 7 students were recruited from 6 schools within Nairobi metropolitan area in Kenya. Information about the academic performance of participating students in the most recent examination was collected. Students were then given parental questionnaires, which they took to their parents and were expected to return within one week; the response rate was 94% (51% girls, 49% boys; average age 13 years ($M = 13.1$, $SD = 0.95$). All students were from the 7th grade (upper primary level) from public primary schools. All students' language of instruction (English) was different from their first language: Kikuyu (26%), Luhya (19%), Luo (7%), Kamba (7%), Kalenjin (7%), Kisii (9%), Meru (6%) and others (19%). Among the parents who participated in the study, 56% had attained college or university education, 27% had completed high school, 14% had completed only primary school, and 3% reported having no formal education. In terms of household income and employment status, 61% identified as casual labourers, 26% as small business owners, 9% as formally employed, and 5% as students. With respect to income levels, 87% of parents reported earnings below Kenya's minimum wage of Ksh. 15,203 (USD 117). Collection of data from all research participants was done in compliance with the Kenya's Data Protection Act, 2019, which ensures data safety, confidentiality, and security.

Measures

Independent Variables: Family Routines

Fifteen questionnaire items were selected as indicators of family routines. The selection was based on the theoretical and developmental origins of the Family Routine Inventory (FRI) (Boyce et al., 1983; Jensen et al., 1983). Whilst Jensen et al. (1983) identified and validated 10 general domains of FRI, this study employed a data-driven approach that replicated only five domains, based on eigenvalues from principal component analysis (see Table 1 below). Components with eigenvalues of 1 or greater were retained.

Table 1. Principal Component Analysis: Eigenvalues and Variance Explained

Principal Component	Eigen Value	Variance Explained (%)	Cumulative Variance Explained (%)
1	3.50	17.44	17.44
2	2.88	14.32	31.77
3	2.32	12.97	44.74
4	1.48	9.48	54.22
5	1.06	7.91	62.12
6	0.66	7.34	69.47
7	0.46	5.61	75.07
8	0.30	5.07	80.15
9	0.17	4.50	84.65
10	0.06	4.04	88.69
11	0.05	3.51	92.20
12	0.05	3.13	95.33
13	0.03	1.96	97.29
14	0.02	1.44	98.73
15	0.02	1.27	100.00

Suppose that questionnaire items are denoted by $i \forall i = 1, \dots, 15$ while principal components are denoted by $j \forall j = a, \dots, e$ and factor loading τ . Then it follows that the i^{th} item belongs to the j^{th} principal component if $\tau \geq 0.5$. Table 2 presents the list of questionnaire items and the associated factor loadings in each of the selected principal components.

Table 2. List of Questionnaire items, 5 Principal Components and Factor Loadings

Questionnaire Item	Principal Component (with Factor Loadings)				
	a	b	c	d	e
All my family members have enough meals throughout the year.	0.548	0.345	-0.389	0.248	0.425
In most cases, there is a house help to take care of the child/children.	0.779	-0.071	0.035	0.133	0.372
My family has stable income throughout the year.	0.637	-0.159	0.345	0.319	0.283
I ask my child about schoolwork.	0.009	0.602	-0.044	0.142	0.230
I check my child's books, school bag, and uniform.	-0.239	0.637	-0.177	0.310	0.416
I keep records of my child/children's performance all the time.	0.265	0.550	0.186	0.159	0.239
Every member of my family has a sense of security all the time.	0.265	-0.142	0.575	0.416	0.168
Family environment supports and boosts self-esteem of my child/children.	-0.283	-0.381	0.788	0.301	0.354
My child/children feel loved in the family.	0.142	0.142	0.761	0.248	0.115
I participate directly in the academic affairs of my child/children. (fits somewhat in bonding too, but closer to active involvement routines)	-0.027	0.389	0.3186	0.522	0.088
I take my child to school personally in case there is an issue.	0.257	0.124	0.221	0.743	0.195
I take my child/children for fun during events such as holidays and birthdays.	0.327	-0.363	0.265	0.539	0.159
In most cases, there is at least one relative staying in my house.	-0.336	0.071	0.142	0.327	0.513
In this family, both parents and children live together most parts of the year.	0.301	0.239	-0.186	0.265	0.504
There is open communication among family members.	-0.389	-0.416	0.221	0.381	0.735

By examining the clustering of items in the principal components presented in Table 2, the following were the labels that corresponded to FRI scale:

- a) Basic needs provision routines: These encompass the structured habits families establish to ensure the consistent availability of household basic needs such as food. Households' adherence to well-structured provisioning routines, daily necessities, adequate meals, and availability of a house help was taken as a latent measure of evidence of sufficient basic needs provision.
- b) Academic performance monitoring routines: These include regular actions parents take to track and support their children's educational progress (Darling & Tilton-Weaver, 2019). These routines include daily or at least frequent discussions about schoolwork, checking children's books and school materials, and ensuring that children maintain discipline in their studies. This also included parents personally escorting their children to school when necessary.
- c) Emotional support routines: These routines involve structured behaviours that create a nurturing and psychologically secure environment for children (Alhuzimi, 2021; Harrist et al., 2019). These routines include acts that encourage open communication about emotions and promote the child's self-esteem. These are habits that consistently demonstrate affirmations and supportive interactions.
- d) Family outing routines: Involve the habitual practice of engaging in recreational activities. These include regular trips, celebrations, and leisure activities. Families that prioritize structured outing routines scored higher compared to those that did not.
- e) Family bonding routines: These are daily or at least regular interactions that promote closeness among family members. These include engaging in open communication, spending time together in shared spaces, and expressing love and care.

Reliability and Validity

The psychometric properties of the above-described family routine subscales were assessed using Cronbach's alpha as a measure of internal consistency of the items, and the results are presented in Table 3.

Table 3. Cronbach's alpha of family routines subscales

Sub-scale	Items	Alpha
Basic needs provision routines	3	.782
Academic performance monitoring routines	3	.773
Emotional support routines	3	.843
Family outing routines	3	.791
Family bonding routines	3	.817

The results in Table 3 show that all five subscales of family routines demonstrated good internal consistency, with Cronbach's alpha values ranging from .773 to .843. These values are above the widely accepted threshold of .70 (Tavakol & Dennick, 2011). This indicates that the items within each subscale reliably measure the intended construct. Among the subscales, emotional support routines recorded the highest reliability ($\alpha = .843$), suggesting strong coherence among its items. Family bonding routines ($\alpha = .817$) and family outing routines ($\alpha = .791$) also showed good consistency, reflecting stable measurement of shared family experiences. Basic needs provision routines ($\alpha = .782$) and academic performance monitoring routines ($\alpha = .773$). Taken together, these subscales provide consistent and dependable measures of family routines, and hence their suitability for further analysis in this study.

Criterion Variable: Academic Performance

Data were collected between 17th and 26th November 2023 from students in the final class under Kenya's 8-4-4 curriculum. Under this curriculum, assessments were reported as percentage scores in five subjects: English, Kiswahili, Mathematics, Science, and Social Studies & Religious Education (SSRE). Overall performance was determined by taking the simple arithmetic mean of the scores across these subjects. Schools administered three continuous assessment tests (CATs) and one end-of-term examination. Standardized national examinations were taken only at the end of primary school. At the time of data collection, a student's academic performance was determined by the percentage score from the most recent test or examination.

Analysing Data

All fifteen questionnaire items measuring family routines were structured as 5-point Likert scale items. All items were positively worded, and responses were numerically coded such that 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, 5 = *Strongly Agree*. Figure 1 below shows a Pareto chart showing the missing value profile of each of the test items.

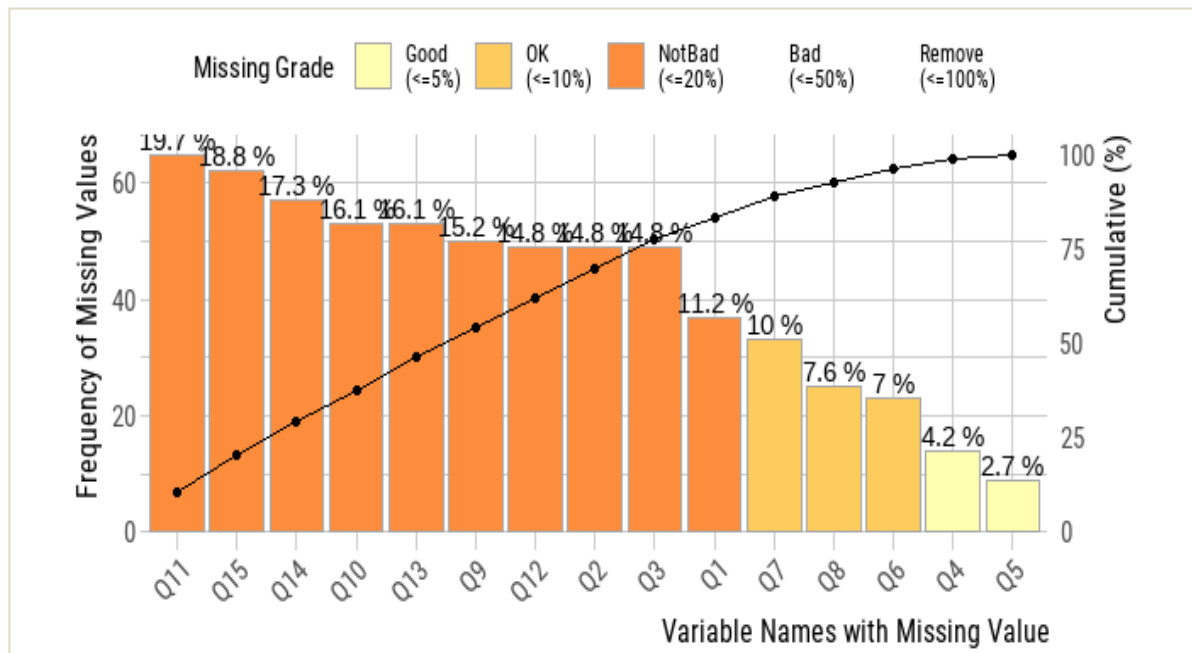


Figure 1. Pareto Chart with Missing Values

Based on these results, there were no severe missing values that would warrant exclusion of any items, and hence all items were used. However, based on the list-wise operation of the Principal Component Analysis (PCA) method that is affected by missing values, the missing values are estimated using the adapted tree-based multiple imputation method (Föge et al., 2024). This is a machine learning (ML) approach based on non-parametric imputation by chained random forest (Hong & Lynn, 2020; Ramosaj & Pauly, 2019), implemented by the *missRanger* package in R (Mayer, 2024).

The PCA was used, and 5 Principal Components (PCs) were identified from the fifteen items, each having 3 items. Each of these components was treated as a sub-scale or domain of family routine to mimic the original FRI. Using qualitative assessments, each sub-scale was given a suitable descriptive name that corresponds to what the clustered items related to (refer to independent variables: family routine for more details). The total score of each sub-scale was computed by simple arithmetic means, and z-scores were computed. Academic performance was computed by averaging individual subject scores reported by teachers of participating students. Similarly, the z-scores for each subject as well as total academic performance were computed. Thus, all study variables were continuous and scaled:

$$z = \frac{x - \mu}{\sigma}$$

Where z is the z-score value, x individual score, μ is the mean and σ the standard deviation.

Exploratory data analysis (EDA) was initially conducted to summarize key descriptive statistics of the academic performance variable. Gender-based comparisons were systematically explored for each subject to assess differences between male and female students. Pearson correlation analysis was subsequently employed to examine the relationships between individual family routine variables and student academic performance.

To assess the role of family routines on academic performance, a generalized linear regression model (GLM) was constructed. In this model, total academic performance served as the dependent variable, while all measured family routines constituted the independent variables. Finally, feature importance analysis was conducted to ascertain the relative contribution and marginal importance of each family routine variable in explaining variations in academic performance.

Results

Figure 2 presents descriptive analysis of academic performance across subjects and student gender (female vs male). The analysis of mean scores across the five subjects reveals slight gender differences in performance (*presented in diagonal*). For instance, both male and female students scored a mean of 51.4% in the English language. In Kiswahili, male students had a higher mean score (52.1%) compared to female students (50.6%). Similarly, in Mathematics, male students performed better (52.5%) than female students (50.7%). A similar trend was observed in science, where male students had a mean score of 52.1%, slightly higher than the 51.2% recorded for female students. In SSRE, the mean scores were nearly identical, with females scoring 51.9% and males 52.1%.

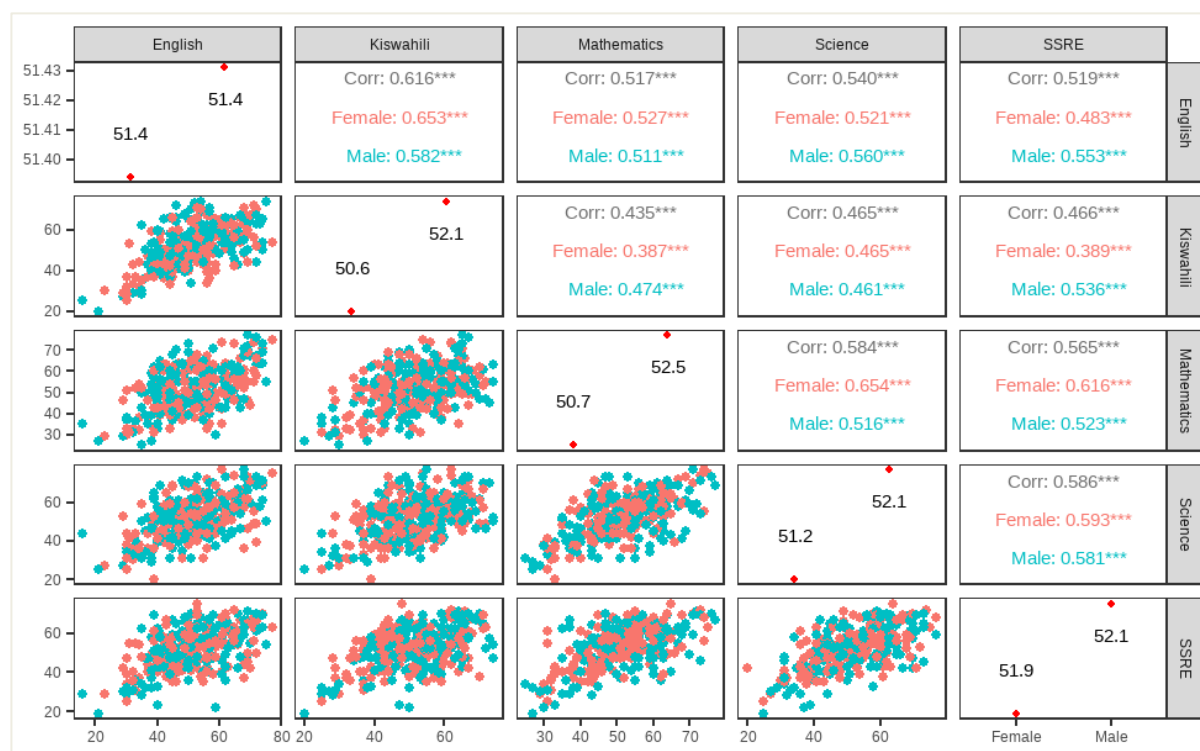


Figure 2. Descriptive Analysis of Academic Performance

The correlation analysis indicates varying relationships between subjects, with some notable gender-based differences. English and Kiswahili had the strongest overall correlation ($r = .616$), with a higher association for female students (.653) than males (.582). Mathematics and Science had a significant overall correlation ($r = .584$), with a notably stronger relationship among female students ($r = .654$) compared to males ($r = .516$). SSRE displayed moderate correlations with other subjects, but these were generally stronger for male students, for example, with Kiswahili ($r = .536$) and Science ($r = .581$). The findings suggest that female students exhibit stronger cross-subject correlations compared to their male counterparts.

Table 4 shows the correlation analysis between family routines and academic performance in the five subjects. The correlation analysis shows significant associations between structured family practices and students' educational outcomes with varying weights across domains and subjects.

Table 4. Correlation Between Family Routines and Academic Performance

Variable	1	2	3	4	5	6
1 Student age(years)						
2 Basic need provision routines	-.017					
3 Academic monitoring routines	.012	-				
4 Emotional support routines	.015	-	-			
5 Family outing routines	-.107	-	-	-		
6 Family bonding routines	.026	-	-	-	-	
7 English	.037	.436***	.182***	.108	.078	-.034
8 Kiswahili	.097	.394***	.164**	.129*	.026	.019
9 Mathematics	.019	.426***	.229***	.097	.009	-.004
10 Science	.021	.404***	.159**	.105	.198***	.066
11 SSRE	.052	.460***	.208***	.122*	.126*	.058

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Basic needs provision routines show the strongest positive correlations across all subjects; SSRE ($r = 0.460$, $p < .001$), English ($r = 0.436$, $p < .001$), Mathematics ($r = 0.426$, $p < .001$), Science ($r = 0.404$, $p < .001$), and Kiswahili ($r = 0.394$, $p < .001$). This indicates that when families in informal settlement consistently provide essential resources like food, students tend to perform better in school. These findings suggest that children from homes with structured support are more likely to excel in most subjects.

Secondly, academic monitoring routines also exhibit significant positive correlations with English ($r = 0.182$, $p < .001$), Kiswahili ($r = 0.164$, $p < .01$), Mathematics ($r = 0.229$, $p < .001$), Science ($r = 0.159$, $p < .05$), and SSRE ($r = 0.208$, $p < .001$).

This indicates that parental involvement in a child's education (e.g., such as checking books, tracking academic progress, and engaging in school-related activities) plays an important role in enhancing academic performance.

Other family routines also demonstrate positive associations with academic performance, though with varying degrees of significance. Emotional support routines, which focus on self-esteem and creating a psychologically secure environment, are positively correlated with Kiswahili ($r = .129, p < .05$), Science ($r = .105$), and SSRE ($r = .122, p < .05$). This suggests that children who feel emotionally supported at home may develop better language and social skills. Family bonding routines do not show strong correlations with academic performance. This may suggest that while general family interactions contribute to emotional well-being, they may not directly impact academic performance. A similar trend is observed with family outing routines which exhibit no significant positive correlations with most academic subject, except with science ($r = .198, p < .001$). and SSRE ($r = .126, p < .05$). Though not statistically significant, there was a slight negative correlation between family outing routines and student age ($r = -.107$). This may suggest that frequent outings might reduce structured study time, particularly as children grow older, leading to poorer academic performance. Overall, the results emphasize the strong influence of basic needs provision and academic monitoring routines on student academic achievement.

Figure 3 presents feature importance analysis of the role of each family routine on overall academic performance. The feature importance analysis quantifies the extent to which each family routine domain contributes to overall academic performance. The values represent standard deviation points above the mean baseline. The overall model demonstrated a good fit, with an R^2 value of .38, suggesting that the five domains of family routines together explained approximately 38% of the variance in students' academic performance. These results imply that while all family routines positively influence academic outcomes, domains related to emotional support and performance monitoring exert the strongest effects.

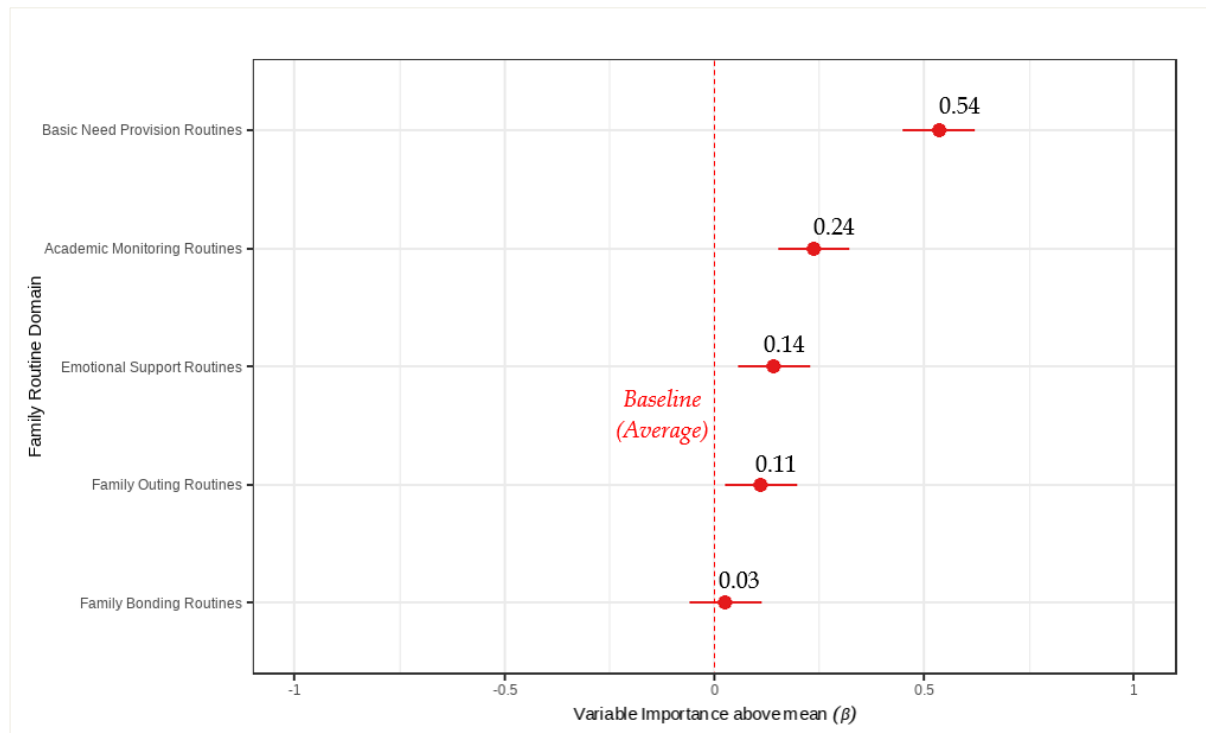


Figure 3. Feature Importance Analysis of Family Routines in Academic Performance

Results show that basic needs provision routines carried the strongest association with academic performance ($\beta = 0.54$, 95% CI [0.49 – 0.59]). Put simply, children who come from households where food and other essentials are reliably available tend to do better at school. This seems intuitive as hungry or anxious children are less likely to concentrate, but the strength of the association is striking. It suggests that in informal settlements, where basic resources are often precarious, the provision of these essentials may act as a foundation for learning. While this aligns with earlier work linking household resources to attention and engagement (Friedline et al., 2021; Morgan et al., 2022; Zhang et al., 2020), one might still ask whether provision routines are capturing broader household stability rather than food security alone.

The feature importance analysis also highlights academic monitoring routines as meaningful contributors ($\beta = 0.24$, 95% CI [0.16 – 0.32]). This suggests that when parents regularly check homework, ask about school progress, or discuss learning, children's outcomes improve. Yet the association is more modest compared with basic needs. This may indicate that parental oversight helps, but it cannot fully offset structural challenges like overcrowding or resource scarcity. Past research supports this interpretation, showing that monitoring fosters discipline and motivation (Mokal & Ahmad, 2023; Otani, 2020); however, the magnitude appears to be context-dependent.

By contrast, emotional support routines showed only a moderate link ($\beta = 0.14$, 95% CI [0.07 – 0.21]). This finding may surprise readers, given the wealth of evidence on socio-emotional wellbeing and learning. It is possible that emotional support works indirectly rather than showing up as a direct predictor of grades. The relatively smaller coefficient does not diminish its importance, but it does suggest that emotional support alone may not be sufficient in environments where material needs are uncertain.

The associations for family outing routines ($\beta = 0.11$, 95% CI [0.03 – 0.19]) and family bonding routines ($\beta = 0.03$, 95% CI [–0.01 – 0.07]) appear weaker. Outings may offer children relaxation and social exposure, but they do not seem to translate strongly into academic outcomes. This may be because time spent outside the home may reduce time for study, or because such activities are irregular in informal settlements. Bonding routines, while valuable for cohesion, also seem to have little measurable impact on school performance unless they are tied directly to learning activities.

These results suggest that the family routines most strongly associated with academic performance are those that secure children's basic physiological and educational needs. Emotional and social dimensions, though important, may play a more indirect role. This interpretation fits with the broader research question: the study does not claim causality, but the patterns emerging from the data suggest that in contexts of deprivation, stability in daily provision and parental academic oversight are more closely tied to school achievement than other, more general forms of family interaction.

Discussions

This study examines the relationship between family routines and academic performance among middle school students in informal settlements. The study provides insights into the direct empirical linkage between structured family routines and academic performance beyond early childhood in informal settlements, where socioeconomic adversity significantly modifies conventional family routines. The results show a significant relationship between specific family routines and academic performance. This partly aligns with existing evidence; however, there are subtle distinctions shaped by the context of informal settlements.

Consistent with previous studies, routines related to basic needs provision are most strongly associated with academic performance across all measured subjects. This finding aligns with earlier research. Stable household provision of basic needs contributes significantly to children's overall developmental and learning outcomes (Morgan et al., 2022; Turnbull et al., 2022). This finding reinforces prior assertions by Ferretti and Bub (2017) that structured family environments substantially impact children's readiness for schooling. However, unlike earlier research, this study explicitly links these routines directly with measurable academic outcomes beyond general readiness. The strong influence of basic need provision routines observed in the current study resonates with the broader literature emphasizing the detrimental effects of poverty and economic instability on child development and educational outcomes (Rocha, 2012; Simiyu et al., 2019). In informal settlements characterized by irregular income, inconsistent access to basic resources, and high levels of economic stress, ensuring the routine provision of basic needs such as food significantly buffers children against academic underachievement. These routines are less structured and predictable compared to conventional benchmarks such as those proposed by Boyce et al. (1983). This suggests the need for policies and interventions that specifically strengthen the economic capacity of households within informal settlements to sustainably enhance children's academic outcomes.

The study further identified academic monitoring routines as significantly associated with better academic outcomes. This result is consistent with Zhang et al. (2020), who argued that parental academic involvement mediates the relationship between family socioeconomic status and children's academic success. The present findings further expand this discourse by empirically demonstrating the positive impact of academic monitoring routines, specifically within the challenging context of informal settlements. Hence, targeted interventions to enhance parental awareness and capacity to engage effectively in their children's academic activities could significantly boost educational outcomes in marginalized communities.

Emotional support routines demonstrated a moderate yet noteworthy positive impact on academic performance, particularly in subjects that require expressive skills, such as Kiswahili and social studies. This aligns with findings from Alhuzimi (2021) and Harrist et al. (2019), who highlighted the critical role emotional support plays in fostering psychological resilience and adaptive skills necessary for academic success. While the observed influence is modest compared to direct academic engagement or basic needs provisioning, the findings underscore the indirect but essential role emotional stability plays in supporting students' academic performance. Thus, creating emotionally supportive environments in economically disadvantaged settings may enhance students' resilience and their ability to cope with academic pressures.

Contrary to traditional expectations, family bonding and outing routines exhibited limited associations with academic performance in this context. Previous research (Chu & Jhuo, 2023; Fiese et al., 2002) emphasized general family interactions and recreational activities as vital for socio-emotional well-being but did not explicitly establish clear academic outcomes. The marginal impact observed here suggests that, within informal settlements, leisure and family bonding routines might have minimal direct academic benefit unless explicitly aligned with academic-supportive activities. This discrepancy may stem from the resource constraints and competing priorities within informal households,

where leisure activities potentially compete with structured study time. It raises critical considerations regarding how family leisure time in constrained contexts might be strategically optimized to enhance both emotional well-being and academic productivity.

These results suggest that routines securing children's basic physiological and educational needs appear most strongly linked to academic performance in informal settlements. Yet this does not imply that emotional or bonding practices are unimportant. Instead, these routines may operate through indirect pathways or within cultural logics not fully captured by the statistical models. Future research should account for potential confounders such as parental education, income, and household size, and adopt longitudinal or mixed-method approaches to better understand causal mechanisms. By situating family routines within ecological and resilience frameworks, we see them less as isolated practices and more as adaptive strategies shaped by poverty, cultural norms, and structural constraints.

Conclusion

The study demonstrates that structured family routines significantly influence students' educational outcomes, with basic needs provision routines emerging as the most influential factor. Consistent provision of basic needs, particularly stable access to food and necessary household resources, is paramount in enhancing academic performance across diverse subjects. Parental engagement in monitoring and supporting children's academic activities significantly improves students' educational outcomes. Emotional support routines, although moderately impactful, also contribute meaningfully by fostering a secure psychological environment, thereby indirectly influencing academic achievement. On the other hand, routines involving family bonding and outings demonstrated limited direct impact on academic outcomes. This suggests that while such practices are essential for emotional well-being, they may not strongly influence academic performance within economically constrained environments typical of informal settlements. The understanding of family routines presented in this study emphasizes the need for context-specific measures rather than traditional middle-class benchmarks, which fail to adequately represent the complexities of life in informal settlements.

Recommendations

- The study recommends creating targeted interventions that enhance basic resource availability and support. Such interventions would directly address the barriers families face, thereby improving children's academic outcomes.
- The study recommends expanding existing family routine inventories to include context-specific practices prevalent in marginalized communities.
- Future research should investigate longitudinal impacts and explore deeper mechanisms by which these routines influence academic trajectories.
- Future studies could explore the effectiveness of interventions designed to facilitate adherence to beneficial family practices in resource-constrained settings.

Limitations

While this study provides valuable insights into the role of family routines and practices in academic performance in middle school for populations in informal settlements, it's worth noting that a cross-sectional design, by its very nature, restricts the ability to make causal inferences. In this regard, although associations between variables were evident, the temporal sequence of events could not be established rigorously. This limits the extent to which conclusions about cause and effect can be derived from the findings of this study. Additionally, data on household and home environment factors were self-reported by parents through questionnaires returned via the students. It is possible that this method may have introduced social desirability bias or inaccuracies due to recall errors. This has the potential to affect the reliability of the responses.

Ethical Statement

This study was conducted in strict compliance with rules and regulations provided by the Kenya National Commission for Science, Technology and Innovation (NACOSTI) and the Data Protection Act, 2019. While in school, students were given detailed background information about the study and were requested to participate on a voluntary basis. Only students who were willing to participate were recruited. As they were given questionnaires to take to their parents, they were informed that parental participation was also voluntary, and in the event their parent(s) were unwilling, they would simply return the unfilled questionnaire. The parental questionnaires and student performance were matched using pseudocodes, and no personal information was collected.

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Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this study. The research was conducted independently, and no financial, institutional, or personal relationships influenced the design, implementation, analysis, or reporting of the findings.

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Authorship Contribution Statement

Juma: Conceptualization, design, analysis, writing. Kiambati: Editing, reviewing. Kavua: writing, editing, reviewing, proofreading

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