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SOCIOECONOMIC DETERMINANTS OF CARE PROVISION AMONG FAMILY CAREGIVERS OF CHILDREN WITH THALASSEMIA: THE MEDIATING ROLE OF CAREGIVER BURDEN

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Abstract

Thalassemia major is a chronic hereditary blood disease that obligates lifelong medical treatment, and imposes significant burden on family caregivers. This study was conducted to investigate the correlation between the socioeconomic status, social support, caregiver burden and the provision of care for a thalassemia major patient by his/her family in District Sargodha, Pakistan. A quantitative cross-sectional research design was used and data were obtained from 300 family caregivers using a structured questionnaire. Standardized and adapted instruments were used to evaluate economic status, social support, care burden and care provision. Descriptive statistics, Pearson correlation, multiple regression analysis and mediation analysis with Hayes' PROCESS Macro Model 4. were used for data analysis. Results showed strong positive correlations between economic status, social support and caregiver burden and care provision. Economic status and social supports strongly predicted care provision, with economic status being the stronger predictor. The causal roles of economic status and social support on the care provision were then tested for mediation by caregiver burden using mediation analysis; the results showed that the relationship between economic status and care provision and between social support and care provision were significantly mediated by the level of caregiver burden, suggesting that caregiver burden is an intervening factor between economic status and care provision and between social support and care provision. The study emphasizes that caregivers' experiences with thalassemia are not solely medical, but also economic and social, which includes social support. Increased financial support, caregiver help, and family-oriented health care strategies can help lower the caregiver burden and enhance care for people with thalassemia major.

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INTRODUCTION

Thalassemia major is a lifelong inherited blood disorder that requires medical management, such as regular blood transfusion and iron chelation therapy as well as constant clinical follow-up. Treatment is long term and patients are not the only ones who are stressed by that; the ability of the family caregiver to help the patient cope effectively with treatment is affected by socioeconomic factors (Khan et al., 2025). Education level of caregivers has an impact on their knowledge about disease management, adherence to treatment and utilization of health related information and services (Baqar et al., 2024). Similarly, financial resources influence families' ability to cope with health care costs, such as transportation to health centres, medication expenses and transfusion costs (Javaid et al., 2024).

Socioeconomic inequalities, including family income, place of residence, caregiver responsibilities, and healthcare accessibility, significantly shape the caregiving experiences of families living with thalassemia. Caregivers from economically disadvantaged backgrounds often experience increased financial strain, transportation difficulties, and challenges in maintaining regular treatment schedules. Moreover, families residing in rural or resource-limited areas face additional barriers due to greater distances from specialized healthcare facilities and increased travel-related burdens (Singh et al., 2022; Khan et al., 2018).Furthermore, heavier family responsibilities can limit the time, money, and attention given to the health care of a patient (Baqar et al., 2024). Families, communities, and health care professionals can provide social support to the caregiver, which can lessen caregiver stress and increase the capacity to meet treatment needs (Sikandar et al., 2024).

Emotional, physical, financial and time strain can be a burden to caregivers and impact the quality and continuity of care for people with chronic disease. Increased psychological distress, decreased quality of life, and decreased effectiveness of caregiving have been found to be associated with higher caregiver burden (Askaryzadeh Mahani et al., 2023; Sikandar et al., 2024). Furthermore, a number of challenges exist among the families of thalassemia in Pakistan, such as a shortage of health care facilities, financial limitations and lack of access to specialized treatment facilities (Javaid et al., 2024). Caregiver knowledge and education are critical determinants of treatment adherence in thalassemia, as caregivers who possess better disease-related knowledge are more capable of supporting regular transfusion schedules and medication compliance. Similarly, household income and healthcare accessibility influence the ability of families to sustain long-term treatment requirements (Lee et al., 2009; Singh et al., 2022).

Although, there is increasing evidence on the problems associated with thalassemia, there is a lack of research that has looked at the combined role of socioeconomic factors in the provision of uninterrupted and quality care to thalassemia children especially in District Sargodha, Pakistan. Thus, the purpose of this study was to assess the effects of socioeconomic variables on the provision of care among thalassemics' caregivers, to determine what role caregiver burden and social support play in the caregiver's caregiving experience.

Literature Review

Thalassemia is a chronic hematological condition that is inherited due to the defective synthesis of hemoglobin and must be treated medically throughout one's life by regular blood transfusion, iron chelation therapy and monitoring of disease-related complications (Taher et al., 2021). While significant improvements in clinical care have led to a better survival rate, thalassemia still presents significant psychological, social, and economic challenges for affected families, especially in LMICs, where health care resources and social protection are inadequate (Farmakis et al., 2022). Pakistan is one of the countries with high rate of thalassemia, estimated to be 5-7% of the population and thousands of children who have to receive lifelong transfusion dependent care (Khan et al., 2025). Most of those who develop the illness are children and teens, creating a long-term management problem that is

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Volume 4 • Issue 6 • October 2026

frequently left to family caregivers and a social and public health issue.

Children with thalassemia are cared for mostly by their family caregivers, especially their mothers. They are expected to manage medical conditions, arrange blood transfusion, give medicines, keep an eye on complications, keep up to the nutrition requirements, plan healthcare visits and offer emotional comfort to affected children (Yasmeen et al., 2024). The ongoing nature of thalassemia over many years may impact caregivers' physical health, mental health, social relationships, and quality of life, compared to a more temporary care giving role. There is recent evidence that caregivers of children with chronic illnesses experience higher levels of stress, anxiety, depressive symptoms, and emotional exhaustion because of the longer duration of caring for children with chronic illnesses (Hood et al., 2024).

Psychological difficulties associated with caregiving have become an important area of research in the context of chronic illnesses. Previous studies have demonstrated that caregiver distress, including stress, anxiety, and emotional exhaustion, is associated with reduced ability to manage treatment demands, impaired family functioning, and poorer quality of life among both caregivers and patients. The continuous responsibilities of long-term disease management can increase psychological strain and negatively affect caregiving effectiveness (Pinquart & Sörensen, 2007; Adelman et al., 2014; Yasmeen et al., 2024; Prajapati et al., 2021). Frequently, caregivers experience fear about the future of the child's life, about the course of the disease, emotional exhaustion and helplessness in thalassemia care. Such challenges are exacerbated by cultural norms, especially in cultures where mothers are expected to take the lead in child care. In Pakistan, mothers take on most of the care responsibilities, which may make it difficult for other family members to participate and lead to social isolation and psychological pressure (Arooj Sikandar et al., 2024).

Socioeconomic status is one of the most significant determinants of experiences of caregiving. Household income, level of education, level of employment and access to healthcare services are also important factors that influence a families' ability to manage a chronic condition. From a Social Determinants of Health (SDOH) lens, the individuals who have limited economic and social resources are more vulnerable due to less access to health care facilities, financial support, and coping resources (World Health Organization [WHO], 2022). In thalassemia management, socioeconomic disadvantage plays a more significant role as it is required to invest financially in treatment, such as expenses related to blood transfusion, laboratory investigations, transportation, and iron chelating drugs, which need to be provided continuously.

Studies conducted in Pakistan indicate that families of children with thalassemia experience considerable economic hardship due to the lifelong costs associated with blood transfusions, iron chelation therapy, transportation, and other medical needs. A large proportion of caregivers belong to low-income households and struggle to manage treatment expenses, often depending on informal financial support systems, borrowing, and assistance from charitable organizations. Evidence from Pakistan shows that out-of-pocket healthcare expenditures for thalassemia treatment place substantial pressure on household economies, forcing some families to reduce spending on essential needs, compromise children's education, or seek loans to continue treatment (Safdar et al., 2017; Khan et al., 2022). Recent studies further highlight that caregivers experience monetary burden alongside emotional and physical challenges, with financial constraints emerging as a major barrier to providing continuous and adequate care for thalassemic children (Sikandar et al., 2024; Baqar et al., 2025).Stress and financial constraints can lead families to cut spending in other areas of the home, cut back on their own healthcare spending, or push off essential medical visits. This economic strain can lead to caregiver stress and potentially affect their ability to care for their child consistently and effectively. Financial problem and poor geographic access to health care services have

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been shown to have negative impacts on caregivers' treatment management practices and overall psychological health (Avraam et al., 2026).

Educational status is an important determinant of caregiving capacity because caregivers with higher health literacy and disease-related knowledge are more capable of understanding treatment procedures, communicating with healthcare professionals, making informed health decisions, and supporting effective disease management. Limited caregiver health literacy has been associated with poorer self-management support, increased healthcare utilization, and greater caregiver burden (Yuen et al., 2016; Kim, 2021). On the other hand, caregivers with lower educational attainment may face difficulties in understanding medical instructions, navigating healthcare systems, and accessing available health resources. These challenges can become more pronounced in rural areas of Pakistan, where limited health literacy, inadequate healthcare infrastructure, transportation barriers, and restricted access to specialized services may further complicate the management of chronic illnesses such as thalassemia (Yuen et al., 2016). Thus, socioeconomic inequalities could impact caregiving outcomes as these factors result in variations in caregiver knowledge, resources, and management of complex treatment demands.

The concept of 'caregiver burden' is a useful lens for understanding the effects of socioeconomic stressors on caregiver experience. The term caregiver burden was coined by Zarit et al. (1980) and is viewed as a multidimensional burden that arises when caregiving demands exceed personal, social and economic resources. It encompasses personal wellbeing diminishment, financial strain, social constraints, as well as emotional and physical fatigue. Burden is especially important for caregivers of children with thalassemia as treatment may be ongoing for life and the caregiver is always needed for treatment (Ullrich et al., 2017). A recent study revealed that parents of children with chronic diseases report more caregiver burden when they have limited financial resources, social support, and access to health services (Yasmeen et al., 2024).

Caregiver burden is also influenced by family structure, gender roles and social stigma of genetic diseases in the Pakistani culture. Parental guilt and blame can be a problem, especially among the mothers who sometimes are blamed for the child's condition, due to misconceptions about the genetic transmission of the disease (Atkin & Ahmad, 2001). Different studies in various parts of the country have noted that caregivers have been reported with anxiety, depression, hopelessness, and social isolation as a result of financial constraints, healthcare barriers, and lack of awareness in the communities (Aziz et al., 2013; Jamil et al., 2025). The results show that the burden of the caregivers is not just an outcome of the medical needs but can also be shaped by other socioeconomic and cultural factors.

Burden of caregivers could also act as a significant pathway between socioeconomic factors and care provision. Psychological and physical burden can impact caregivers' emotional availability, disrupt the treatment regimen, and negatively affect the quality of care received by children. On the other hand, caregivers with adequate financial resources, strong social support networks, and effective coping strategies are more likely to provide consistent and effective care. Social support reduces caregiver stress by offering emotional reassurance, informational assistance, and practical help, while better economic resources facilitate access to healthcare services and treatment-related needs. These protective factors enhance caregivers' ability to manage the long-term demands of thalassemia care and improve both caregiving quality and patient well-being (Thoits, 1986; Yasmeen et al., 2024; Hood et al., 2024). Thus, the relationship between socioeconomic disadvantages and outcomes of caregiving might be mediated by caregiver burden.

Social support is another factor which can alleviate the burden of the caregiver and enhance the ability of caregiver is another important factor. Social Support Theory (House, 1981) suggests that emotional, informational

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Volume 4 • Issue 6 • October 2026

and instrumental support is important in helping people cope with stressful life experiences. Past studies have shown that psychological distress tends to be lower, and coping skills better, among caregivers who are supported socially (Thoits, 1986, 2011). Formal caregiver support services remain limited in Pakistan, particularly in areas where healthcare resources and specialized support programs are insufficient. As a result, families often depend on informal caregiving networks, including relatives and community members, for emotional, financial, and practical assistance in managing thalassemia care. These informal support systems play an essential role in sustaining long-term care; however, the heavy reliance on family caregivers may increase caregiving responsibilities and psychosocial burden (Anum & Dasti, 2016).

While there have been numerous studies on thalassemia from a biomedical perspective, focusing on therapeutic successes, complications of the disease, and health-related quality of life, the social aspects of patient care have received less attention. Specifically, very limited research has examined the psychosocial environment's effects on care giving practices via psychological pathways (e.g., caregiver burden). There is limited research supporting the mediating role of caregiver burden between the socioeconomic factors and provision of care by family caregivers of children with thalassemia in Pakistan.

Thus, the current study focuses on this research gap, by exploring the relationships among socioeconomic factors, care provision and caregiver burden, as a mediator. This pathway could be useful in developing interventions to support the family, caregiver support programs and policy strategies to reduce caregiver stress and enhance care for thalassemia in Pakistan.

Problem Statement

Caregivers are frequently faced with psychological, physical and financial difficulties because of the ongoing caregiving demands. A lack of formal care in Pakistan, may make them more dependent on their family members, which can also lead to an increase of load on the caregiver. The interaction between economic conditions and social support for caregiver burden and care provided, however, needs to be further explored. This study aims to investigate this gap, studying the socioecological context and social resources of the caregiver experience.

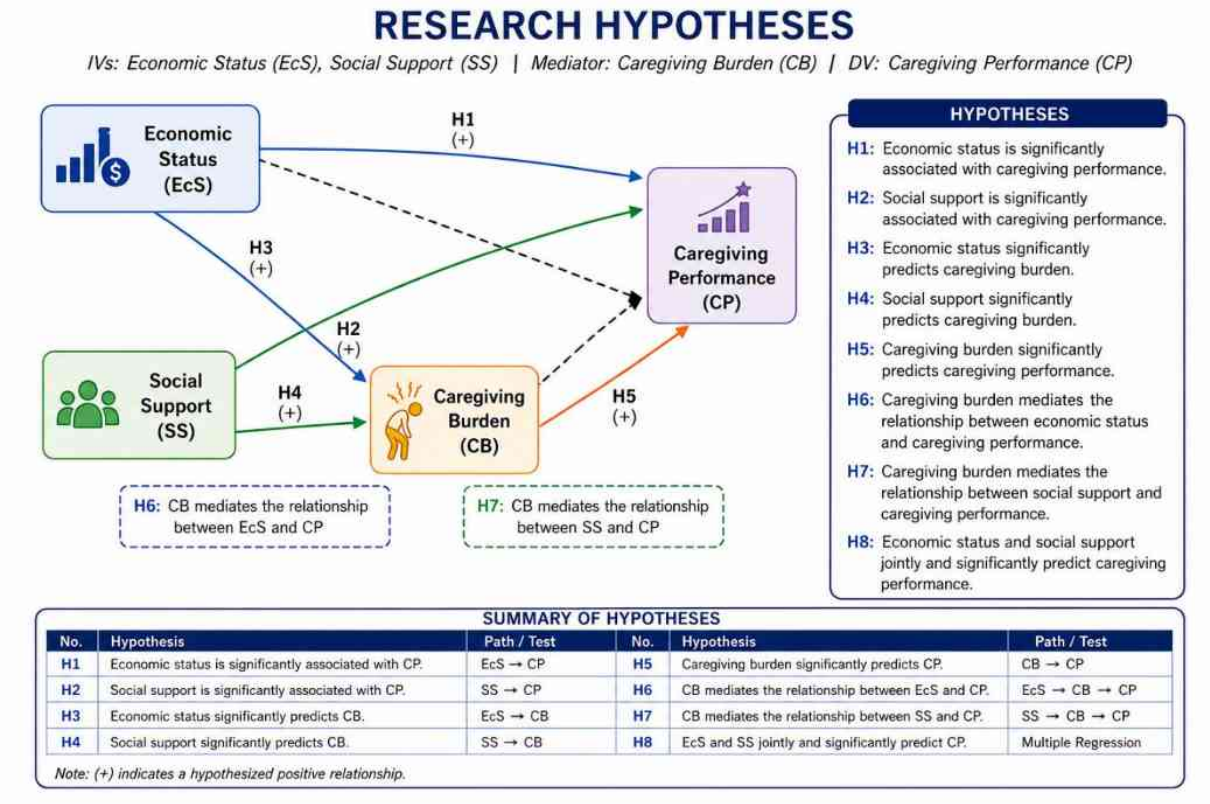
Rationale of the Study

Caring for persons with chronic diseases, disabilities or dependency needs is a major social and family role that can be mentally, physically and financially demanding for the person who cares. In many societies, especially in developing countries, caregiving is done mostly at the family level, and the caregivers' vulnerability to stress and burden may be higher due to the scarcity of healthcare, poor formal care provision and lack of finances. Previous studies have focused on various aspects of caregiver burden; however, little attention has been paid on the interaction between socioeconomic factors and caregiving supports in understanding the caregiver's experiences, especially in a particular sociocultural context of Pakistan. The economic strain might make it harder for caregivers to get health care, to secure the support they need for their care work, and to care for their own health. Social support can also act as a protective resource, which can help to alleviate psychological stress, enhance coping mechanisms, and facilitate caregivers' effective care provision. Hence, the relationship between economic status, social support, caregiver burden and care provision needs to be assessed through this study. This study takes a more comprehensive approach than just focusing on stressors and negative outcomes in caregiving experiences by incorporating both risk factors and protective factors. The results obtained from the research can be used in the field of family sociology, caregiver research, and social policy, with a particular focus on the need for effective social support networks and the need to create caregiver-specific interventions to social policy issues regarding the economic difficulties caregivers encounter. In addition, the study can be used as a basis for caregivers to build programs to support the well-being of caregivers and effective care of dependents.

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An International Peer-Reviewed Open Access Journal

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Volume 4 • Issue 6 • October 2026

Conceptual framework



SUMMARY OF HYPOTHESES

No.	Hypothesis	Path / Test	No.	Hypothesis	Path / Test
H1	Economic status is significantly associated with CP.	EcS → CP	H5	Caregiving burden significantly predicts CP.	CB → CP
H2	Social support is significantly associated with CP.	SS → CP	H6	CB mediates the relationship between EcS and CP.	EcS → CB → CP
H3	Economic status significantly predicts CB.	EcS → CB	H7	CB mediates the relationship between SS and CP.	SS → CB → CP
H4	Social support significantly predicts CB.	SS → CB	H8	EcS and SS jointly and significantly predict CP.	Multiple Regression

Note: (+) indicates a hypothesized positive relationship.

Theoretical Framework

This study is guided by two complementary theoretical perspectives: Caregiver Burden Theory and Social Support Theory. Theories were chosen because they offer targeted explanations for the relationship between the challenges of caregiving, socioeconomic factors, and available support systems and caregivers' lives and what happens to their caregiving.

Caregiver Burden Theory

Caregiver Burden Theory provides the primary foundation for understanding the psychological, physical, social, and economic challenges experienced by individuals who provide continuous care to dependent family members. The theory states that caregiver burden is when demands of the caregiving role surpass a caregiver's personal, financial, and social resources. Opportunities for caring for others, especially if excessive or of high demand, can lead to emotional fatigue, economic difficulty, social isolation and diminished quality of life. Caregiver Burden Theory is the theory used to understand the influences of SES and caregiving factors on perceived caring burden within this study. Economic hardship can put caregivers at greater risk to also have high expense needs for healthcare and less resources for caregiving, adding to their burden. Thus, this theory can be used to explore the association between economic status and burden of care.

Social Support Theory

The social support theory, which has been introduced to explain the protective effect of social resources on coping with caregiving burden, is complementary to the caregiver burden perspective. The theory suggests that emotional, instrumental, informational and social support provided by family, friends, communities and institutions can improve people's coping skills and mitigate the negative effects of stressful experiences. Social support is also an important resource for caregivers in caregiving contexts and can facilitate the caregivers' ability to fulfill their responsibilities and preserve their psychological health. For caregivers, higher levels of perceived social support might help decrease isolation, offer practical support, and boost the caregiver's

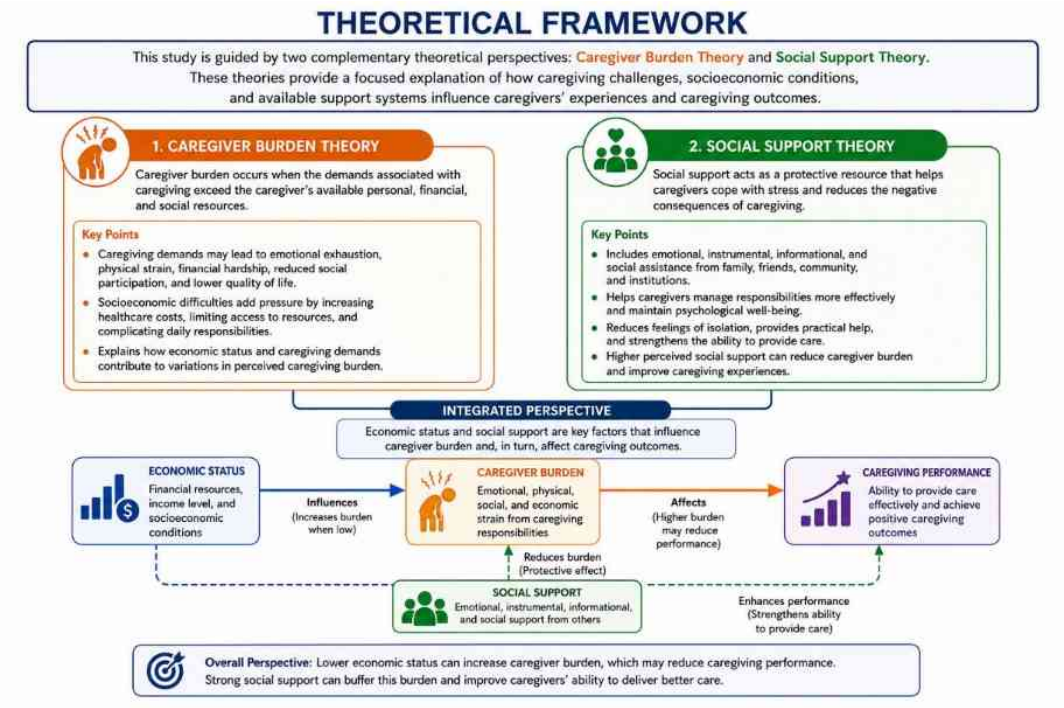
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Volume 4 • Issue 6 • October 2026

capacity to care for themselves. Thus, social support is an essential factor that could affect caregiving experiences and, perhaps, lower caregiver burden and is therefore a topic for this study.

Integration of Theoretical Perspectives

The integrated framework of Caregiver Burden Theory and Social Support Theory offers a comprehensive perspective on caregiving experiences. The stress-engenerating mechanisms that are involved with the caring demands and socio-economic factors are described by the caregiver burden theory, and social support theory describes the buffering effect of available social resources. From this premise, the study suggests that economic conditions and social supports influence caregiver burden and that this burden, in turn, impacts the outcomes of caregiving. Thus, the combined theoretical model highlights the interaction between caregiving stressors (economic challenges and caregiving demands) and protective resources (social support) in shaping caregivers' burden and care provision experiences.



Methodology

A quantitative cross sectional research design was used in this study to explore the association between economic status, social support, caregiver burden and its provision with family caregivers of thalassemia major patients in District Sargodha, Pakistan. A purposive sampling technique was used to select a total of 300 family caregivers. The main participants were primary care takers directly involved in the management and day to day care of thalassemia patients. A structured questionnaire containing information on economic status, social support, caregiver burden and care provision was used for data collection, along with demographic data. The socioeconomic and financial strain indicators were adapted and comprised 5-8 items that reflect household economic resources, treatment affordability, and financial strain, and were used to reflect the economic status. Responses were obtained using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Social support was measured by the Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet et al. (1988) and consisting of 12 items reflecting social support from family, friends and significant others. The items were measured on

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An International Peer-Reviewed Open Access Journal
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Volume 4 • Issue 6 • October 2026

a 7-point Likert-type scale with 1 = Very Strongly Disagree and 7 = Very Strongly Agree. Caregiver burden was evaluated using the Zarit Burden Interview (ZBI) (Zarit, Reever, & Bach-Peterson, 1980) which is made up of 22 items that measure emotional, physical, social, and financial burden associated with caregiving. The care provision was assessed by an adapted Family Caregiving Behaviour/Caregiving Practice Scale, which included 8–15 items to assess treatment management, healthcare support, emotional support and daily care. The data were analysed with SPSS. Data on participant characteristics and study variables were summarized using descriptive statistics such as frequency, percentage, mean and standard deviation. All scales were tested for the internal consistency of the instrument using the Cronbach alpha reliability test. Pearson correlation was conducted to look for an association between variables in terms of economic status, social support, caregiver burden, and care provision. Multiple regression analyses were used to explore the predictive factors of economic status and social support of caregiver burden and care provision. Additionally, mediation analysis, using the Hayes' PROCESS Macro Model 4, was conducted to determine if the relationship between economic status and social support was mediated by caregiver burden, and the relationship between social support and care provision was mediated by economic status. The indirect effects were estimated with 5000 bootstrap samples, with confidence intervals computed not including zero considered as significant mediation. Ethical approval from the relevant institution was gained and informed consent, confidentiality and voluntary participation throughout the research process maintained.

Table 1: Frequency and percentage distribution of demographic variable

Sr	Variable	Frequency (n)	Percent (%)
1	**Age**		
	21–30 years	72	24.0
	31–40 years	108	36.0
	41–50 years	78	26.0
	Above 50 years	42	14.0
2	**Income (PKR)**		
	15,000–25,000	85	28.3
	26,000–35,000	99	33.0
	36,000–45,000	85	28.3
	Above 45,000	31	10.4
3	**Education**		
	Matric	70	23.3
	Intermediate	96	32.0
	Graduation	102	34.0
	Post-graduation	32	10.7
4	**Relationship with Patient**		
	Mother	128	42.7
	Father	82	27.3
	Sibling	45	15.0
	Other relatives	45	15.0
5	**Family Size**		
	2–5 members	96	32.0
	6–8 members	147	49.0
	9–10 members	51	17.0
	Above 10 members	6	2.0

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 6 • October 2026

6	**Residence**		
	Urban areas	113	37.7
	Rural areas	153	51.0
	Others (e.g., landlord-provided)	34	11.3

The demographic results reveal that most caregivers were in the middle age group as 36.0% were between 31-40 years while 26.0% were 41-50 years. This is a typical pattern of care since parents are usually tasked with the long-term care of children with thalassemia major. The mothers were the majority caregivers (42.7%) indicating the major role of females in chronic illness care in Pakistani families. The majority of respondents were from rural areas (51.0%) indicating possible issues with access to health care and health care treatment continuity.

Table 2: Pearson Correlation Matrix among Economic Status, Social Support, Caregiver Burden, and Care Provision

Variables	ES	SS	CB	CP
Economic Status (ES)	1	.493**	.306**	.770**
Social Support (SS)	**	1	.657**	.574**
Caregiving Burden (CB)	**	**	1	.545**
Care Provision (CP)	**	**	**	1

A Pearson product-moment correlation analysis was performed to explore the characteristics of the relationships between Economic Status (ES), Social Support (SS), Caregiving Burden (CB) and Care Provision (CP) in 300 participants. The results showed that all the variables of the study were significantly and positively correlated ($p < .001$). Economic Status was moderately positively associated with Social Support ($r = .493$, $p < .001$) and weakly positively associated with Caregiving Burden ($r = .306$, $p < .001$), with higher scores on these measures being associated with better economic status. In addition, there was a strong positive correlation between Economic Status and Care Provision ($r = .770$, $p < .001$), indicating that those caregivers who had the resources to be economically better able to provide care were more likely to be good caregivers. Social Support was strongly positively correlated with Caregiving Burden ($r = .657$, $p < .001$) and moderately positively correlated with Care Provision ($r = .574$, $p < .001$), suggesting that greater social support was related to greater caregiving burden as well as better caregiving practices. Similarly, Care Provision was moderately correlated with Caregiving Burden ($r = .545$, $p < .001$), indicating that higher levels of care provision were associated with higher levels of caregiving burden. In general, the findings show high degrees of interrelatedness between the variables of the study, supporting the hypothesized relationships between the study variables.

Table 3: Multiple Regression Analysis Predicting Care Provision (CP) from Economic Status (ES) and Social Support (SS)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.802[a]	.643	.640	3.74488

a. Predictors: (Constant), SS, ES

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Volume 4 • Issue 6 • October 2026

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7494.909	2	3747.454	267.214	.000[b]
	Residual	4165.171	297	14.024		
	Total	11660.080	299			

a. Dependent Variable: CP
b. Predictors: (Constant), SS, ES

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.508	.992		2.528	.012
	ES	.811	.050	.643	16.127	.000
	SS	.247	.038	.258	6.471	.000

a. Dependent Variable: CP

A multiple linear regression analysis was conducted to examine the predictive effects of Economic Status (ES) and Social Support (SS) on Care Provision (CP). The regression model was statistically significant, $F(2, 297) = 267.214$, $p < .001$, meaning that both economic status and social support significantly predicted care provision. The model explained 64.3% of the variance in care provision ($R^2 = .643$, Adjusted $R^2 = .640$). Economic Status was significantly and positively associated with Care Provision ($B = .811$, $\beta = .643$, $t = 16.127$, $p < .001$), with those caregivers who experienced higher economic status reporting higher levels of care provision. Similarly, social support was also a significant positive predictor, with $B = .247$, $\beta = .258$, $t = 6.471$, $p < .001$ in relation to Care Provision, indicating that the more social support received, the better the caregiving practices. Economic Status was the best predictor of care provision among the predictors, with the standardized beta coefficient (β) of .643 compared with .258 for social support. Overall, the results suggest that both economic resources and social support are important factors in improving care provision by the caregivers.

Table 4: Mediation Analysis of Caregiving Burden (CB) in the Relationship Between Economic Status (ES) and Care Provision (CP)

Path	B	SE	t	p	95% CI	β
Outcome: Caregiving Burden (CB)						
ES → CB (a path)	.479	.086	5.547	<.001	[.309, .649]	.306
Outcome: Care Provision (CP)						
ES → CP (Direct effect; c′ path)	.840	.042	19.859	<.001	[.756, .923]	.665
CB → CP (b path)	.275	.027	10.180	<.001	[.222, .328]	.341
Total Effect (c path)						
ES → CP (Total effect)	.971	.047	20.812	<.001	[.879, 1.063]	.770
Indirect Effect (ES → CB → CP)	.132	.029	—	—	[.075, .188]	.104

Note. Bootstrap sample = 5000. Confidence intervals are based on 95% bootstrap percentile intervals. ES = Economic Status; CB = Caregiving Burden; CP = Care Provision.

Model Summary Table

Model	Outcome Variable	R^2	F	df	p
Model 1	Caregiving Burden (CB)	.094	30.774	(1,298)	<.001
Model 2	Care Provision (CP)	.698	342.972	(2,297)	<.001

JOURNAL FOR SOCIAL SCIENCE STUDIES
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ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 6 • October 2026

Total Effect Model	Care Provision (CP)	.592	433.131	(1,298)	<.001

Mediation analysis was conducted using PROCESS Macro Model 4 (Hayes, 2022) to determine if there was a medication pathway from economic status (ES) to care provision (CP) through caregiving burden (CB). The results indicated that economic status significantly predicted caregiving burden (B = .479, SE = .086, t = 5.547, p < .001, R^2 = .094) accounting for 9.4% of the variance in caregiving burden. Moreover, the caregiving burden and economic status were significant predictors of care provision (B = .275, p < .001; B = .840, p < .001; and R^2 = .698 of the variance in care provision). Overall, the economic status of the families was significantly associated with care provision (B = .971, p < .001). The indirect effect through caregiving burden was also significant (B = .132, 95% Boot CI [.075, .188]), as the confidence interval did not include zero. This means that the economic status is partially mediated through caregiving burden in explaining the relationship between economic status and care provision. The results suggest that there is direct and indirect effect of economic status on the provision of care, which reflects its impact on the care-giving burden.

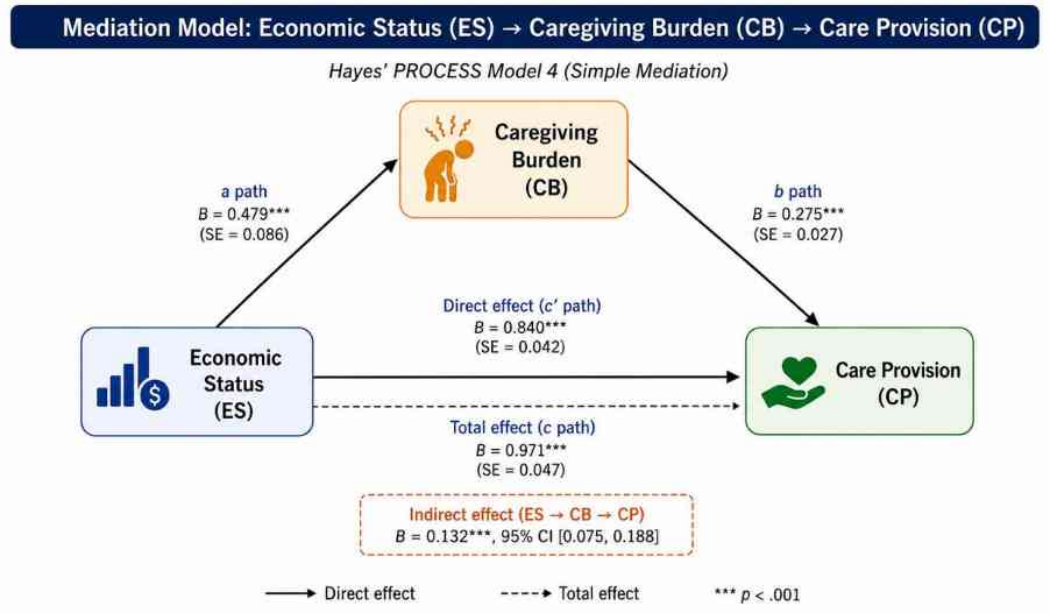


Table 5: Mediating Effect of Caregiving Burden (CB) on the Relationship Between Social Support (SS) and Care Provision (CP)

Path	B	SE	t	p	95% CI	β
Outcome: Caregiving Burden (CB)						
SS → CB (a path)	.780	.052	15.025	<.001	[.678, .882]	.657
Outcome: Care Provision (CP)						
SS → CP (Direct effect; c′ path)	.365	.058	6.289	<.001	[.251, .479]	.381
CB → CP (b path)	.237	.049	4.857	<.001	[.141, .333]	.294
Total Effect (c path)						
SS → CP (Total effect)	.550	.045	12.115	<.001	[.461, .639]	.574
Indirect Effect (SS → CB → CP)	.185	.040	—	—	[.107, .262]	.193

Note. Bootstrap sample = 5000. Confidence intervals are based on 95% bootstrap percentile intervals. SS = Social Support; CB = Caregiving Burden; CP = Care Provision.

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Volume 4 • Issue 6 • October 2026

Model Summary Table

Model	Outcome Variable	R^2	F	df	p
Model 1	Caregiving Burden (CB)	.431	225.741	(1,298)	<.001
Model 2	Care Provision (CP)	.379	90.738	(2,297)	<.001
Total Effect Model	Care Provision (CP)	.330	146.761	(1,298)	<.001

A mediation analysis (Hayes, 2022) was performed by using PROCESS Macro Model 4 to determine if there was mediation between social support (SS), caregiving burden (CB) and care provision (CP). Results showed that social supports significantly predicted caregiving burden, B = .780, SE = .052, t = 15.025, p < .001, accounting for 43.1% of the variance in caregiving burden (R^2 = .431). For the second regression model, social support (B = .365, p < .001) and caregiving burden (B = .237, p < .001) were the only significant factors that accounted for 37.9% of the variance in care provision (R^2 = .379). Overall, social support significantly influenced care provision, B = .550, p < .001. In addition, the indirect effect of social support on care provision when considering the caregiving burden was statistically significant (B = .185, 95% Boot CI [.107, .262]). Therefore, caregiving burden significantly mediates the relationship between social support and care provision.

Discussion

The present study aimed to explore how socioeconomic factors and social support affect care provision for family caregivers of thalassemia major and to examine the role of caregiving burden as a mediated factor. The results offer valuable insights into the interaction between economic resources, social networks, and caregiving stress in shaping caregiving experiences in the context of Pakistan. In general, the results suggested that economic status and social supports were strong predictors of provision of care and that the caregiving burden was a good partial mediator of the relationships. The results show that the social and economic context of families is an important determinant of caregiving outcomes, in addition to medical needs.

The results showed that there was a strong positive correlation between the provision of care by caregivers and their economic status, meaning that better economic status was associated with more effective care provision to thalassemia patients. This discovery aligns with previous research that has shown that economic stability helps in accessing health services, transport, medicines, and treatment-related resources that is crucial for managing chronic diseases (Javaid et al., 2024). The management of thalassaemias is an ongoing cost because of the repeated blood transfusions, iron chelation therapy, laboratory investigations and frequent hospital visits. If, however, caregivers are facing financial challenges they might have trouble with consistent treatment routines, which would have a negative impact on their quality of care. Adopting the view of the Social Determinants of Health, people with fewer socioeconomic resources are likely to have more difficulties accessing healthcare and managing diseases. (WHO, 2022).

The regression analysis further demonstrated that economic status had a stronger predictive relationship with care provision than social support. This finding suggests that financial capacity represents a fundamental resource enabling caregivers to meet the practical demands associated with thalassemia management, including healthcare costs, treatment adherence, and access to medical facilities. Evidence from Pakistan indicates that families caring for children with thalassemia experience considerable monetary burden due to lifelong transfusion requirements, medication expenses, and transportation costs, with many caregivers facing financial stress while attempting to maintain continuous treatment (Khan et al., 2018; Yasmeen et al., 2024). Recent qualitative evidence further highlights that financial constraints remain a major barrier affecting caregivers' ability to access and sustain optimal thalassemia care (Baqar et al., 2024). Economic stress can cause psychological strain, can make caregivers less able to support their

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Volume 4 • Issue 6 • October 2026

own health care, and can create less opportunity for obtaining specialized medical care. Therefore better financial support for affected families can help to support families' care.

Social support and care provision was also found to be associated positively and significantly in the study. Caring individuals who felt better supported by family, friends and important people described better practices of care. This result is in agreement with the Social Support Theory (House, 1981) which states that emotional, informational and instrumental support can strengthen a person's coping resources and offset the detrimental impact of stressful situations. Prior research has established that social support increases the likelihood of a caregiver's adaptation through emotional reassurance, assistance, and beneficial health-related information (Thoits, 1986, 2011). Supportive networks can help the family carry out responsibilities better, in the context of thalassemia care, which involves long-term treatment requirements.

The findings also showed that there was a significant association between economic status and caring burden. While economic status was positively related to burden, this relationship was relatively less strong than its relationship with care provision. This indicates that the burden of caregivers with higher resources can still be high as thalassemia requires constant and intensive involvement, irrespective of their financial status. According to the Caregiver Burden Theory, burden is a result of the disproportion between the demands of care giving and the psychological, physical and social resources available (Zarit et al., 1980). Emotional fatigue, concern about the future of the patient and the need for the caregiver to be constantly involved in the treatment of chronic disease, can be felt even by caregivers with a large income.

There was a strong positive correlation between social support and caregiving burden. This may seem surprising, but it could be an indication that those with more caregiving responsibilities are more likely to reach out to and be supported by their networks. In Pakistan which is a collectivist society, families and communities are able to help when the need for assistance due to illness is great. Thus, higher perceived support levels could reflect higher exposure to caregiving challenges, not necessarily lower exposure to stress. Previous studies also have indicated that social support may serve to respond to the drive to more caregiving, but may also act as a protective factor that enhances coping and psychological functioning (Thoits, 1986, 2011).

Mediation analysis revealed that the caregiving burden was a significant mediator between the economic status and care provision. The indirect effect was also significant, showing that economic conditions affect caregiving patterns indirectly via their effect on caregiver burden. Limited economic resources may cause higher stress for caregivers because they have trouble paying treatment costs, traveling to treatment, and dealing with treatment responsibilities. This additional responsibility can then impact on their capacity for the best care. The results contribute to the existing literature by showing that the role of caregiver burden as a mediator between socioeconomic disadvantage and caregiving outcomes is significant.

Likewise, social support significantly mediated the association between social support and care provision. It appears that social support has an indirect effect on caregiving effectiveness through the influence on caregiver burden, as well as a direct effect. Supportive relationships can minimize emotional stress, enhance coping ability and facilitate care providers in managing treatment day-to-day. But if the care giving needs are great, even those who have a good support system can feel substantial burden. It is therefore crucial to reinforce the formal and informal family support for families living with thalassemia.

The results lend credence to the theoretical integration of Caregiver Burden Theory and Social Support Theory. Theories of caregiver burden focus on the psychological and physical burden of extended caregiving needs and resource depletion, while theories of social support focus on how social resources can affect coping with caregiving needs. These perspectives offer a full picture of caregiving experiences as they reveal that caregiver outcomes are the

ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 6 • October 2026

product of stressors acting on protective resources.

The results are significant for family sociology, health care practice and social policies in Pakistan. Healthcare interventions for thalassemia should shift from a patient-centred approach to medical care to include a caregiver-centred approach to support programs. Caregiver burden can be lower and the quality of care can be enhanced through financial assistance, transport aid, counselling of caregivers, and community-based support. Additionally, healthcare professionals must consider caregivers as partners in disease management and offer them proper information and emotional/social support. Finally, this study highlights the role of economic status and social support in determining the type of care provided to the caregivers of thalassemia patients, and that the provision of caregiving burden is an important mediating mechanism. The results highlight the need to tackle both structural factors (e.g., financial problems and access to health care) and psychosocial factors (e.g., social support and well-being of caregivers) to optimize the quality of care. Increased efforts and reinforcement of caregiver-focused interventions can help enhance the quality of life for caregivers and persons with thalassemia.

Limitations of the Study

This study has a number of drawbacks. The cross-sectional design does not allow for causal relationships between economic status, social support, caregiver burden, and care provision. Secondly, the findings of this study may not necessarily be generalized to other populations as the purposive sampling method was used in District Sargodha. Thirdly, self-reported measures may suffer from response bias. Also, other variables like disease severity, health condition of the caregivers and coping were not studied. Longitudinal and mixed methods designs with larger samples are needed for future research to gain deeper insights into caregiving experiences.

Recommendations of the Study

The study suggests a range of supports for caregivers, such as psychological counseling, health education and stress management. Financial or transportation support and better access to health care should be provided to overcome economic barriers. Enhancing family and community support systems can reduce the burden of carers and enhance care provision. More and longer follow-up studies of a larger number of caregivers are needed to study other psychosocial and clinical factors that impact caregivers.

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