



# The Open Psychology Journal

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## RESEARCH ARTICLE

### Patterns of Associations among Resilience, Risk and Protective Factors in Adolescents with Blindness

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#### Abstract:

#### Aims:

Blindness is a bane to humanity globally, and living with blindness is a challenge to anyone – young or old, educated or uneducated, rich or poor. Many countries have high rates of blindness, and Ethiopia is one. The study aims to explore the level of resilience, the extent of risk, and protective factors operating upon blind adolescents in Addis Ababa.

#### Background:

Resilience can significantly impact the quality of life of humans. Risk-taking and protective factors found in one's environment are significant predictors of resilience, valid even for the blind. The study intends to explore the level of resilience, the extent of risk, and protective factors operating upon blind adolescents in Addis Ababa.

#### Objectives:

The objectives identified for the study are:

- To assess the risk and protective factors operating upon Adolescents With Blindness (AWB) and establishing the pattern with which risk factors and protective resources relate to each other and predict resilience.
- To investigate the way the type of onset of blindness and some selected demographic variables relate to resilience among AWB.

#### Methods:

Data for the study were collected randomly from 80 blind adolescents using the Connor-Davidson Resilience Scale, Risk Factors Scale Adolescent Form, and Protective Factors Scale-Adolescent Form. The data were analyzed with t-test, one-way ANOVA, and multiple linear regression.

#### Results:

Low levels of resilience, presence of higher risk factors and serious lack of protective resources existed among AWB. While risk factors were negatively correlated with resilience, protective factors correlated with resilience positively. The risks and protective resources found in various levels of the environment together accounted for 89.3% of the variance in resilience. Gender, time of onset of blindness, parental education and family income influenced resilience.

#### Conclusion:

This study presents an all-inclusive picture of the resilience status of AWB's, the extent of risk and protective factors currently operating upon them under the present context of Addis Ababa. Adolescents having blindness currently living in Addis Ababa are less resilient. They are faced with umpteen risk factors at home, school, neighborhood, community and societal levels.

**Keywords:** Adolescents with blindness, Protective resources, Resilience, Risk factors, Addis Ababa, Societal levels.

#### Article History

Received: September 3, 2020

Revised: February 4, 2021

Accepted: February 18, 2021

## 1. INTRODUCTION

The absence of usable vision or the status of being blind is a seriously limiting factor for any individual. For Adolescents With Blindness (AWB), challenges posed by blindness interact with various developmental demands and can pose difficulties. Adolescence is a time when individuals pass through a high amount of turbulence. Adolescents pass through rapid cognitive, psychosocial and physical growth during this period, which demands extra efforts [1, 2]. AWB needs to handle multiple challenges associated with blindness and development. Ethiopia is a country where rehabilitation and support for blind and vulnerable persons are minimal. The study intends to examine how AWB salvage their quality of life. It also examines the level of resilience of AWB in the Ethiopian context and the risks and protective resources that operate on them.

Losing eyesight is a life stage that would have a significant negative impact on any individual [3 - 5], including seriously limiting learning abilities [3]. Globally 1.4 million children are estimated to be blind, out of which around 320000 belong to sub-Saharan Africa (WHO, 2000). Child blindness in Ethiopia is estimated to be around 5.3%, against the global rate of 1 to 10% [4, 5]. Like in any other country, Ethiopians also consider blinds as liabilities incapable of self-support or creating rewarding societal relationships. Due to these, they are considered to be incapable of being resilient [6, 7]. Despite these irrational beliefs, many AWBs succeed in life [7].

However, most AWBs are compelled to live deplorable lives. Those who succeed, despite adversities, are resilient. They possess vast resources to overcome adversities and thrive [8]. As to the individual characteristics that promote resilience, researchers have identified many such characteristics, such as self-esteem, personal control, optimism, *etc.*, among typically developing populations [9]. Mere possession of these characteristics may not help an AWB bloom resilient if the environmental condition is not conducive. Environmental factors which facilitate resilience are quite specific to contexts, and knowledge from one context may not hold good for another context. Thus, it becomes essential to explore the environmental factors, risks, and protective resources, facilitating or impeding adolescents' resilience in the Ethiopian context because such context-specific knowledge is lacking.

There has been a marked increase in resilience research among the blind in the last few decades. Indeed, when it comes to Persons With Disabilities (PWDs), resilience is implied as an attribute of such individuals [10]. Due to their physical impairments, the disabled are identified as non-resilient [11] and are relegated to be vulnerable [12]. However, as resilience theory progressed, resilience is no longer considered exclusively within the domain of an individual's personal qualities. It is found out that social and physical support systems and resources are also vital in fostering resilience development [10]. This implies that resilience can be made and remade by forces within and outside of the individual. It is then

possible to think that PWDs in general and AWB can emerge resilient if they live in an inclusive society with all the needed disability-related provisions. In studying the resilience of any population holistically, it is significant to shift the focus away from individualistic accounts to risk factors and protective resources that operate upon them. The current scholarship on resilience shifted its position from resilience as a personal trait to resilience originating from outside of the individual. Building resilience, thus, cannot be a matter of building individual capacity. There is a compelling need to challenge the socio-cultural and structural barriers that threaten the resilience of AWB. Developing resilience in AWB is a dynamic process defined by "situational, contextual and individual factors" [13]. Hence, a search for factors promoting and demoting resilience at the individual, family, school, community, and cultural levels becomes an absolute necessity to capture the process of resilience development among AWB fully.

There is a compelling need for empirical examination about resilience among AWB [14], as studies have mostly been limited to normal children and adolescents [15]. Most of the AWB of Addis Ababa, Ethiopia, have been struggling in their lives under deplorable conditions. Many of them are involved in activities like begging. However, there is an absolute lack of understanding of why a certain portion of AWB population exhibit resilience. No study has examined this aspect, nor has the Ethiopian context's level of resilience been examined. Further, there is a lack of knowledge about how risk factors and protective resources combine to produce resilience.

Empirical evidence exists between resilience's negative relationship with risk and a positive association with protective resources [16 - 18]. Contra findings have also been reported [19]. Certain protective resources like social support, optimism, higher self-esteem, and self-efficacy have also been associated with resilience [20, 21].

Ethiopia's present politico-legal conditions have provided disabled persons, including AWB, with the required support [22, 23]. The present researchers have observed a highly inappropriate situation for AWB. However, occasions wherein AWBs emerging resilient and successful have also been observed [24]. What makes a few AWB resilient while the majority remain non-resilient is unknown because studies with an objective of mapping of personal strengths of resilience characteristics of AWB in the context of Ethiopia are absent. Further, the risk and protective factors operating upon AWB have also not been investigated into this context. The existing theories of resilience suggest the importance of personal resilience traits [25], and the need of being exposed to multiple risks and certain protective resources in the society [26, 27], and the interaction between the two [28, 29], in the development of resilience in any population. Against this backdrop, the present study intends to examine the resilience levels AWB of Addis Ababa. The various risk and protective factors that operate on AWB and their relationships that predict resilience are also sought to be examined. It is also intended to investigate the way blindness sets in and how certain demographics influence resilience. A fair understanding of the resilience status of AWBs and the complex and dynamic nature of factors that work for and against their development would facilitate their rehabilitation.

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## 2. MATERIALS AND METHODS

### 2.1. Sample

No data on the number of AWB who were living in Addis Ababa were available and hence drawing a representative sample of this population was out of scope. Hence the schools where these adolescents were studying were mapped. Finally, AWB between the ages of 13 and 19 years who were studying at 12 primary schools, four secondary schools, and five preparatory schools in Addis Ababa was identified, and they constituted the population of the study (N=230). Of the 230 (124 males and 106 females) AWB, 80 (35% of the population; 44 males and 36 females;) were drawn as samples following the stratified proportionate random sampling technique. The sample size was determined following Cochran's (1977) formula.

### 2.2. Instruments

Connor-Davidson Resilience Scale (CD-RISC), Risk Factors Scale- Adolescents Form (RFS-A Form), and Protective Factors Scale- Adolescents Form (PFS-A Form) were the three instruments used in this study. CD-RISC consists of 25 items on a five-point scale. The responses ranged between 0 (not true at all) and 4 (true nearly all the time). Resilience is determined by summing up the scores, which could range between 0 and 100. Higher the scores, the greater the resilience. CD-RISC has sound psychometric properties (alpha of 0.89 and item-to-total correlations between 0.30 and 0.70), hence enjoying robust reliability and validity [30]. The tool is ideal for measuring individual resilience across populations [31]. An Amharic (Ethiopian national language) version, translated from the original English version, was used to collect data. The internal consistency reliability (alpha) of the collected data was 0.92.

RFS-A Form (33 items) and PFS-A Form (37 items) developed and semi-standardized in the Ethiopian context, considering risk and protective factors were used in the study. They had a five-point Likert-scale ('not at all true' to 'true nearly all the time'). The scoring ranged between 0 and 4. High scores were designated to indicate a higher prevalence of risk and protective factors.

All the test development processes were followed rigorously. Steps followed include creating an item pool, examining appropriateness, culture fairness, uniqueness and clarity, categorization into sub-scales/domains, conduct of face and content validity, *etc.* by five experts in disability studies, psychology, and measurement and evaluation. The resultant tool had 33 items for RFS-A and 33 items for PFS-A. A few examples of the items include: my family members do not take me with them to ceremonies and recreational places (Family home risk factors sub-scale), I am a friend of none of the sighted students (school risk factors subscale), the roads and buildings of my community are suitable for my movement (community protective factors subscale).

The internal consistency reliability was conducted for all the sub-scales, and Cronbach's alphas ranged between 0.72 and 0.82. The reliability coefficients are acceptable 32.

### 2.3. Data collection

Data was collected through five data collectors, who were duty trained. Written, informed consent was obtained from each participant prior to collecting data. All ethical guarantees like confidentiality, anonymity, right to withdraw, *etc.*, were exercised. Since the participants were blind, the data collectors were actively involved in the data collection process. The participants had the opportunity to seek clarification at any given point in time during the process.

### 2.4. Data Analysis

The data were entered into the SPSS software and checked and edited in preparation for analysis. Assumptions such as normality, variance, multicollinearity, *etc.*, were checked, and no serious violations were observed. Descriptive statistics were used to calculate the levels of resilience and the prevalence of risk and protective factors. Independent samples t-test was employed to compare participants' resilience based on gender and nature of blindness. The inter-correlations among variables were determined by using Pearson product moment correlation. Multiple linear regression analysis was employed to determine the amount of variance accounted for by risk and protective factors on resilience.

## 3. RESULTS

### 3.1. Levels of Resilience, Risk, and Protective Factors

On a possible score range of zero to 100, the sample scored a mean resilience score of 41.69 (SD=12.28). The scores ranged from 14 to 80.

A higher score represents stronger resilience and vice versa. The descriptive statistics on risk and protective factors are presented in Table 1.

Since this study is the first of its kind in Ethiopia and the distribution of the study variables in either the general population or any population of people having blindness is not available in the context of Ethiopia, an accurate interpretation of the descriptive statistics on the level of the study variables among AWB was out of sight. However, to give meaning to the obtained descriptive statistics to help future researchers make comparisons and provide baseline information, a somewhat different method was adopted in interpreting the descriptive figures. The respondents' mean scores on all the sub-scales of risk and protective factors, the possible score ranges were placed on a continuum, and scores falling toward the minimum possible score of each sub-scale of risk factors were considered desirable as they indicate the least risks. Further, scores above the continuum's mid-value were taken as negative as they indicated the existence of high risks. Whereas scores closer to the maximum score on the continuum on protective factors were treated desirable as they indicate the availability of protective resources, and scores closer to the lowest possible scores were considered undesirable as they point towards the absence of protective resources. Further, scores below the mid values on the continuum of protective factors sub-scales were taken as negative as they indicated deficits of protective resources.

**Table 1. Descriptive statistics on risk and protective factors (n = 80).**

-	Minimum possible score	Maximum possible score	Mid-scale value	Observed Mean	SD
Home risk factors	0	40	20	24.61	5.25
School risk factors	0	56	28	41.57	4.32
Neighborhood risk factors	0	12	6	10.09	1.70
Community risk factors	0	12	6	9.53	2.50
Society risk factors	0	12	6	10.59	1.68
Home protective resources	0	56	28	22.69	7.03
School protective resources	0	52	26	15.05	6.11
Neighborhood protective resources	0	16	8	5.13	2.58
Community protective resources	0	12	6	3.40	3.29
Society protective resources	0	12	6	3.97	1.47

**Table 2. Correlations among resilience, risk and protective factors (n = 80).**

-	1	2	3	4	5	6	7	8	9	10
1. Resilience	-	-	-	-	-	-	-	-	-	-
2. Home risk factors	-.424**	-	-	-	-	-	-	-	-	-
3. School risk factors	-.521**	.235*	-	-	-	-	-	-	-	-
4. Neighborhood risk factors	-.685**	.304**	.238*	-	-	-	-	-	-	-
5. Community risk factors	-.427**	.010	.034	.227*	-	-	-	-	-	-
6. Society risk factors	-.716**	.233*	.333**	.416**	.317**	-	-	-	-	-
7. Home protective resources	.739**	-.539**	-.598**	-.422**	-.606**	-.238*	-	-	-	-
8. School protective resources	.743**	-.387**	-.394**	-.603**	-.259*	-.634**	.224*	-	-	-
9. Neighborhood protective factors	.588**	-.193	-.311**	-.485**	-.264*	-.368**	.447**	.433**	-	-
10. Community protective resources	.430**	-.242*	-.267*	-.298**	-.126	-.235*	.336**	.331**	.480**	-
11. Society protective resources	.682**	-.023	-.303**	-.471**	-.500**	-.538**	.490**	.484**	.403**	.296**

\*\*p < 0.01; \*p < 0.05

The results in Table 1 show that in all the sub-scales of risk factors, the participants' mean scores fell below the mid-scale value, indicating higher levels of risk factors at all the environmental subsystems. On the other hand, the results also showed that adolescents lack protective resources at each level of their environment as the entire mean scores on all the protective factors sub-scales were below the mid-scale value.

**3.2. Relationships among Resilience, Risk and Protective Factors**

Pearson product-moment correlation was conducted to examine relationships among resilience and all the sub-scales of risk and protective factors. A correlation matrix of these variables is shown in Table 2.

As can be seen from Table 2 that resilience had moderate to large negative correlations with all the sub-scales of risk factors, and they were significant at 0.01 level. The correlations between resilience and the sub-scales of protective factors were positive and large except for community protective factors. Community protective factors correlated with resilience moderately at 0.01 level. Further, all the sub-scales of risk factors, and sub-scales of protective factors were positively correlated among themselves either at 0.01 or 0.05 levels. The only exception was community risk factors and home risk factors, and school risks and community risks, which had no significant correlation. Further, almost all the sub-scales of risk factors were found to be negatively and significantly correlated with the sub-scales of protective factors either moderately or

with a large effect size. No significant correlation emerged between the other factors.

**3.3. Risk and Protective Resources as Predictors of Resilience**

Multiple linear regression analysis was employed to develop a model for predicting AWB's resilience from the ten groups of risk and protective factors. Basic descriptive statistics and regression coefficients are shown in Table 3. Each predictor variable had a significant correlation with resilience and significant partial effects in the full model. The 10-predictor model was able to account for 89.3% of the variance in resilience ( $F_{(10, 69)} = 67.13; p < .001; R^2 = .893$ ).

**3.4. Relationship between Demographics and Resilience**

Sub-samples were formed based on the sample's gender, the onset of blindness, education of father and mother and family income. Independent samples t-test, one-way ANOVA, and post hoc pairwise comparisons were employed to examine if significant differences existed as a function of the demographics mentioned above. Independent samples t-test between males (M=45.36, SD=12.31, n=44) and females (M=37.19, SD=11.56, n=36) yielded a statistically significant mean difference ( $t_{(78)} = 2.29, p < .05$ ) with males scoring higher in resilience than females. To examine if the onset of blindness influenced resilience, participants were grouped into persons with adventitious (M=45.26, SD=15.80, n=43) and congenital (M=37.54, SD=14.82, n=37) blindness. Independent samples

t-test revealed a significant mean difference between adventitiously and congenitally blind AWB ( $t_{(78)} = 2.16, p < .05$ ), with adventitiously blind persons scoring higher on resilience than congenitally blind persons.

To explore if parents' level of education influenced resilience, mothers' and fathers' educational status were considered separately. This was done because it was assumed that mothers exert a greater role in the lives of AWB in the context of Ethiopia, and hence assessing the association of parental educational status on resilience separately would be more informing. To this end, four groups of adolescents were formed based on their mothers' educational status; viz., non-educated ( $M=30.89, SD = 6.46$ ), primary education ( $M=31.70, SD = 9.13$ ), secondary education ( $M=46.37, SD= 9.38$ ) and tertiary education ( $M=54.98, SD = 10.42$ ). Results of one-way ANOVA indicated a significant mean difference among the groups compared ( $F_{(3, 76)} = 17.51, p < .001$ ). Further, Scheffe post hoc comparisons revealed significant mean differences in four out of the six comparisons made, revealing a general trend that as the level of education of mothers increases, the resilience of their adolescent children with blindness increases. That is, AWB, whose mothers were tertiary educated, had significantly higher resilience than AWB whose mothers were non-educated ( $MD=24.07, p < .001$ ) and primary educated ( $MD=23.26, p < .001$ ). Further, adolescent children of secondary-educated mothers had significantly higher resilience in comparison with AWB, whose mothers were primary educated ( $MD=14.67, p < .001$ ) and non-educated ( $MD=15.48, p < .001$ ). However, children of non-educated mothers did not significantly differ in their resilience from adolescents with mothers having primary education. Further, no significant difference emerged between adolescents whose mothers had secondary and tertiary education.

Similarly, adolescents were categorized into the same four groups based on their fathers' educational status, namely, non-educated ( $M=28.35, SD=7.13$ ), primary educated ( $M=34.40, SD=6.30$ ), secondary educated ( $M=42.72, SD=9.54$ ), and tertiary educated ( $M=55.84, SD=10.05$ ). One-way ANOVA results revealed a statistically significant mean difference among the groups on their resilience ( $F_{(3, 76)} = 19.512, p < .001$ ). Scheffe post hoc test resulted in significant mean differences in four out of six pairs of comparisons made. As in the case of mothers' education, a general trend that as fathers' level of education increases, the resilience of their adolescent children increases emerged. That is, AWB whose fathers were tertiary educated had significantly higher resilience than AWB whose fathers were secondary educated ( $MD=13.19, p < .001$ ); primary educated ( $MD=21.44, p < .001$ ); and non-educated ( $MD=27.49, p < .001$ ). Further, Adolescent children of secondary-educated fathers had significantly higher resilience than AWB, whose fathers were non-educated ( $MD=14.37, p < .001$ ). However, children of non-educated and primary educated fathers and primary educated and secondary educated fathers did not differ significantly on their resilience.

One's income greatly influences the quality of life of anyone. To examine if the family income influenced resilience of AWB, the sample was grouped into five groups based on their total family income in Ethiopian Birr (1 \$= approximately 29 Birr). The sub-samples thus formed were with the monthly income from 1000-2000 ( $M=28.43, SD=6.53$ ), 2001-3000 ( $M=32.22, SD=4.80$ ), 3001-4000 ( $M=40.40, SD=8.14$ ), 4001-5000 ( $M=49.82, SD=9.79$ ) and greater than 5001 ( $M=56.50, SD=10.64$ ) Birr. Results of one-way ANOVA yielded a statistically significant mean difference in resilience ( $F_{(4, 75)} = 16.54, p < .001$ ). Follow-up Scheffe post hoc pair-wise comparison indicated a pattern of difference wherein AWB from lower-income families had a significantly lower level of resilience than adolescents from the highest income groups. The detailed results are shown in Table 4.

Table 3. Multiple regression analysis predicting resilience (n = 80).

Predictors	b	β	r
Home risk factor	-.315	-.102*	-.424**
School risk factors	-.496	-.172**	-.521**
Neighborhood risk factors	-1.650	-.131***	-.685**
Community risk factors	-.604	-.093*	-.427**
Society risk factors	-1.506	-.156**	-.716**
Home protective resources	.282	.122*	.739**
School protective resources	.717	.269***	.743**
Neighborhood protective resources	.676	.107*	.588**
Community protective resources	.479	.097*	.430**
Society protective resources	1.854	.167**	.682**

Note.  $R^2 = .907$ ; Adjusted  $R^2 = .893$ ; \*\*\* $p < .001$ ; \*\* $p < .01$ ; \* $p < .05$

Table 4. Results of Scheffe post hoc comparisons across the level of family income (n = 80).

Level of income	Level of income			
	2001-3000	3001-4000	4001-5000	>5000
1000-2000	-3.794	-11.971	-21.395**	-28.071**
2001-3000	-	-8.178	-17.601**	-24.278**
3001-4000	-	-	-9.424	-16.100**
4001-5000	-	-	-	-6.676

\*\* $p < .01$

## 4. DISCUSSION

### 4.1. Patterns of Resilience, Risk and Protective Factors among AWB

The mean resilience score of 41.69 on a possible score range of zero to 100 invariably implies weak resiliency and an undesirable position for any population. Though 100 could be considered ideal and unrealistic, especially for persons living with blindness in third world countries, a mean score closer to 100 or significantly above 50—the middle value of the possible score range would have been an encouraging result. Indicating a weak status of resilience, the sample's mean score fell below the median scale value. AWB would require a stronger and higher level of resilience than adolescents without blindness as the demands placed on AWB by their sensory limitations and environmental barriers would demand extra capacities to tackle the day-to-day demands. This becomes more so for AWB who live in the underdeveloped or developing world since habilitation and rehabilitation service, including inclusive provisions and infrastructure in environments, are very limited, if not non-existent, in such societies. Why is the level of resilience is so low in this population? An answer to this question is of paramount importance as that can guide policies and practices designed to enhance the quality of life of AWB. A clearer and well-informed answer to this question can emerge only, if it is answered after exploring the status of risk and protective factors operating upon AWB and also the inter-relationships among resilience, risk, and protective factors in the study context. There is consensus on the lack of a prescribed set of risk and protective factors that prevail on and available for AWB across contexts [33].

As to the status of risk and protective factors, the present study vividly depicts that AWB faces enormous risk factors and lacks protective resources seriously at all the five levels of their environment, viz., home, school, neighborhood, community, and society. As shown in Table 1, adolescents' mean risk factors fell significantly above the median scale value of each sub-scale, whereas the entire protective factors sub-scale means fell well below their median values. This vividly highlights higher risk factors and the absence of an adequate level of protective resources in all the subsystems of adolescents' environment. Such a pattern of risk and protective factors in each subsystem of the environment may be a surprising result in a country where disability issues have been addressed for several years. Two pertinent questions emerge here: (1) why risks are so high, and protective resources are so weak in a country where significant efforts are on to better the quality of life of PWDs? and (2) how higher levels of risks and lower levels of protective factors relate to resilience? A definite answer to the first question is beyond the scope of this inquiry. However, the myths and misconceptions, the nature of attitude of the general public towards PWDs, the commitment of the concerned bodies to address disability issues at the grass-root level, the status of prevention and intervention programs available for PWB, availability of inclusive infrastructure at various societal levels where adolescents routinely operate, *etc.*, need to be thoroughly pondered into to identify accurate answers. While looking at the pattern in which risk and protective factors are associated with resilience, it can be read

from Table 2 that all the sub-scales of risk factors are negatively correlated with resilience, and going by convention for the correlation coefficient, the sizes of these correlations are either medium or large [34]. This finding goes well with the inverse relationships among groups of risk factors and resilience reported earlier [17, 35]. Similar to the finding by Resnick, Roberto, Blacksburg and Gwyther (2011) [20], the correlation between resilience and the sub-scales of protective factors emerged positive with effect sizes of medium to large. The patterns of relations established between resilience and risk and protective resources go well with the existing insight that risk and protective factors are at the opposite ends of resilience development where risk and protective factors predict negative and positive outcomes, respectively [16, 36].

Highlighting the pervasive nature of risk factors across all the environmental subsystems investigated, most of the subscales of risk factors are significantly and positively correlated among themselves. The sizes of these coefficients range from small to moderate. However, home and school risk factors are not significantly related to community risk factors. Generally, it can be well-argued from this result that in the study context, risk factors are widespread across almost all the social systems, which negatively contribute to resilience. The pattern of associations among the protective factors at different environmental systems can be read from Table 2 that all the sub-scales of protective factors are positively correlated among themselves with either small or medium effect sizes. Further, out of the 25 possible correlations among the five sub-scale of risks and protective factors, 23 have significant but negative correlations with effect sizes ranging from small to large. The patterns of correlations that emerged between risk and protective factors within the environmental subsystems and the subsystems themselves depict how risk factors and protective resources are aligned in the study site. These results imply that the resilience of adolescents can be promoted by reducing risks and enhancing protective resources. As to the role of protective resources, there is ample evidence suggesting that resilience results from the complex interplay between an individual and his/her several environments in which the individual can influence a successful outcome by using internal and external protective factors [13, 37-39]. Some researchers even conceptualized resilience as the cumulative effect of multiple protective factors that help an individual succeed despite adversity [40].

Risk and protective resources are not two sides of the same coin, though some overlap can be expected and that is the conceptual position adopted in this inquiry. Hence it is assumed that higher levels of risk factors in tandem with lower levels of protective resources seriously damage resilience development among AWB as the synergy created by these two sets of factors can be devastating. This explains well as to why the study population reported lower resilience. There are higher levels of risk factors at all the environmental sub-sub-systems to further complicate lower levels of protective resources; the synergy created by these conditions would have significantly contributed to the lower level of resilience. Considering that resilience is not a unique trait of few individuals [41], earlier studies on resilience also indicated the importance of external protective factors found at different levels of the environment

in nurturing resilience development [42 - 46]. The revelations of the study thus far are a lower level of resilience, higher levels of risk factors, and lower level of protective resources, and that should be placed against the backdrop of the cultural and social context of Addis Ababa to develop better insight into the status of the resilience of the population, studied. The lack of such protective resources and the presence of higher risks may be attributed to the unfavorable nature of social and cultural environments. Further, the culture of the society where adolescents grew up plays an important role in encouraging or discouraging their resilience development.

In Ethiopian culture, which is not significantly different from Addis Ababa's culture, where physical and mental perfections are highly valued and deviation from it is generally considered a punishment from God, it is not difficult to imagine the impact of lack of eyesight. Persons with blindness here can generate negative societal attitudes, which can generate environmental barriers, both attitudinal and physical. While these barriers give birth to risk factors, they also either remove or prevent protective resources as providing support to persons with disabilities is considered acts against God's will in societies that hold the notion that God's wrath causes disability. Though hidden in most modern societies, this position of societies can silently contribute to less efficient provision of prevention and intervention programs for AWB. When appropriate early prevention and intervention programs are lacking, adolescents often would have difficulty self-navigating even in well-known environments, face with considerable social challenges and barriers from architectural obstacles in buildings to systemic barriers in employment and social participation [47 - 49]. Highlighting the cultural roots of protective resources on the lives of adults living in the context of adversity, researchers placed heavy importance on cultural traditions, religious rituals and ceremonies, and community support services as providing a wide variety of protective functions for fostering resilience [50, 51]. Closer scrutiny of the way with which risks and protective resources predict resilience would further magnify the way with which these factors factor resilience among adolescents with blindness.

#### 4.2. Risk and Protective Factors in Resilience

The results of multiple regressions analysis on different groups of risk and protective factors revealed an outcome that all groups of risk and protective factors jointly predict adolescents' resilience and together account for 89.3% of the variance in resilience. Further, while groups of risk factors negatively contribute to resilience, all the protective factors contribute to adolescents' resilience. Risk and protective factors found at different environment levels, either discouraging or encouraging individuals' resilience capacity, are documented elsewhere, too [15]. Studies from other contexts also reported strong effects of groups of risk and protective factors found at different levels of the environment on resilience development [52 - 54]. The prediction results underscore that protective factors are the key to achieving resilience while risk factors pose a significant threat to an individual's resilience development in Ethiopian context.

Further, it can be read from Table 3 that all groups of risk

and protective factors are significantly predicting the resilience of AWB. A closer examination of the Beta coefficients also indicated that all sub-groups of risk and protective factors have comparable negative and positive contributions, respectively, in resilience development. The variance accounted for by the risk factors in the five environmental subsystems ranges from nine to 17%. Since risk factors in all the environmental subsystems significantly predict resilience negatively, to better the quality of life of AWB in the Ethiopian context, there should be focused and systematic efforts to reduce the plethora of risks operating upon AWB in all environmental subsystems. Though all the sub-groups of risk factors negatively and significantly predict resilience, school-related risk factors damage resilience development more seriously, with close to 17% of the variance accounted for by this group of risk factors followed by societal risk factors with 15.5% of the variance accounted for. This warrants that any efforts to foster the resilience of adolescents should give more emphasis to reducing school-related and societal risk factors. It is encouraging to note that protective resources in all the environmental subsystems significantly contribute to resilience development. Protective factors in the environment's subsystems accounted for 10 to 27% of the variance in resilience. This status underscores the spurt in resilience which can be expected if protective resources are enhanced at different environments parallel to reducing risks. The major contribution among the protective resources comes from school-related protective factors, with a 26.9 percentage of variance in resilience. The vital contributions of school-related risk and protective factors among the five environmental subsystems generate an important insight: schools have a greater contribution to adolescents' resilience development in the Ethiopian context. And hence if a school-related environment is enriched with removing risks and introducing reasonable protective resources, which can do a sea of good in the resilience of AWB. Strengthening inclusive provisions and inclusive education in Ethiopian schools look remedial to it.

#### 4.3. Resilience and Demographics

Resilience development may vary based on the social and environmental resources available for a person. These resources may not be equally provided or available for males and females across different cultures. In a culture where disability is misperceived and stigmatized, PWDs face many deprivations and maltreatments at different levels of their environment. This maltreatment and neglect may be more severe for females with a disability, especially in less developed nations such as Ethiopia [7], as gender inequality is the order of the day even today in such developing nations. As expected, the present study results indicated a statistically significant resilience mean difference between males and females, wherein males have greater resilience than females. Findings of previous studies coming from other contexts on the association between resilience and gender were inconsistent. While some studies indicated the absence of associations between resilience and gender [35], several other studies found strong associations where resilience was higher in females than males [55]. These studies attributed greater resilience of females to the presence of more positive connections of

females with parents, teachers, adults in the community, and peer relations and autonomy experiences than males.

In contrast, going along with the current result, Friburg, Barlang, Martinussen, and Rosenvinge (2005) [56] and Bonanno (2004) [22] reported male gender predicting an increased likelihood of resilient outcomes than female gender. Further, Bonanno, Galea, Bucciarelli, and Vlahov (2007) [57] observed women as less than half as likely to be resilient as men. All these inconsistent results on the association between resilience and gender appear to inform that resilience development varies across contexts and cultures, be it in males or females, and dependent upon the availability of protective resources in a specific context at a given point in time. In Ethiopia, though women are respected and protected, they are placed far below men's social significance. Women here traditionally have been considered child bearers, home makers, and not to contribute to the family and society's economic resources. Hence, for women in general and women with disabilities, protective resources at different levels of the environment may not be made available as it is provided for men. Women with blindness are at a double disadvantage for being women and having blindness. The lower social status assigned to women coupled with the stigma and stereotypes attached to a disability may be jointly contributing to their lower level of resilience than men. Since this study cannot make such a conclusion based on data, further research is required.

Another demographic that was hypothesized to influence resilience was the time of onset of blindness. The blindness that happens at birth or shortly afterward (congenital) and acquired later in life (adventitious) would not impact resilience development as the psychological and day-to-day demands and challenges generated by the time of onset are drastically different. With this presumption, when adventitiously blind respondents were compared with congenitally blind respondents, a statistically significant difference in resilience emerged wherein persons with adventitious blindness were more resilient than congenital blindness. The existing literature is very much inconsistent on the association between the time of onset of blindness and resilience. For instance, Bonanno (2004) [22] explored and compared the level of resilience among the sighted, congenitally, and adventitiously blinded people. The results revealed that people with congenital blindness had higher levels of resilience among all three groups. Another study, consistent with the present study result, revealed that people with adventitious blindness had greater resilience than those with congenital blindness [58]. This may be because individuals with adventitious blindness may retain significant visual memory to profit from descriptions of a visual nature. Even when they retain no visual memory, they still hold the advantage of their previous visual learning, which would motivate them to move about, discover, and interact with their environment. They are often more active, curious, and better coordinated than people with congenital blindness [22]. Further, the secondary and tertiary preventive measures in place in the environment where people who have blindness live, though vital for congenital and adventitiously blind individuals, are of paramount importance for congenitally blind persons. The reason being, they are to capitalize on such

services available for their day-to-day life as they do not have or retain any visual memory. Provisions aiming to rehabilitate or habilitate AWB in Ethiopia are strikingly inadequate as well as inefficient. Stated otherwise, the protective resources available at various environmental subsystems in Addis Ababa may be very much inadequate for congenitally blind persons than adventitiously blind. People with blindness living in such societies are expected to face serious challenges, impeding their resilience. This is all the truer for congenitally blind persons. Such an insight looks more grounded in the context in which this study was conducted.

The role of education in minimizing parents' negative attitudes towards their children with a disability and to a positive outcome of parenting is unassailable across contexts. With this view in mind, the association between mothers' and fathers' education and their adolescent offspring's resilience was examined separately. The results showed a clear association between mothers' and fathers' education and their adolescent children's resilience. In both cases, a near-perfect trend exists; that is, when the level of education of fathers and mothers increases, their adolescent children's level of resilience also increases. What are the ways with which parental education influences the resilience of children? Since this study did not try to answer this question, future researches in those lines look imperative. However, the existing research evidence suggests that parents with better education provide appropriate support and expect their children with disabilities to obtain better grades and want them to proceed to the highest level of education that they can.

In contrast, less and uneducated parents provide lesser support and have lower academic expectations for their children with disabilities [28, 59 - 61]. The changes in parental attitudes towards disability in general and blindness in particular, provision of disability-specific support to their children, parental involvement in the education of children with blindness, and parental expectations about the academic achievement would be brought about by parental education are pertinent questions which need to be answered to capitalize on parental education in resilience development of AWB. Such insights would invariably inform and aid all the habilitation and rehabilitation efforts aimed at enhancing the quality of life of AWB.

Family income can reasonably predict the quality of life of its members; that is, the higher the income, the better its quality. Assuming that AWB living in higher-income families would be exposed to lesser risks and more resources at the family level and would be able to purchase better services outside, the association between family income and the level of resilience of AWB was pondered. As hypothesized, AWB from higher-income families possesses a higher level of resilience than their counterparts from lower-income families. Closer scrutiny reveals that AWB with a family income of less than 4000 Birr is less resilient than those with more than the family income of 4000 Birr. Even though a clear trend of increased resilience following the categorization of family income groups made for this study does not emerge, the general pattern of results indicates the association between income and resilience among AWB.



How does the family income come around and influence the resilience of its members with blindness? Data-based answers to this question are out of this study's purview though they are of absolute importance. It looks logical to infer that when parents come short of enough finance, a child's needs with blindness may remain unmet and affect their caregiving behavior. At the same time, parents who have better monthly income may provide better support for their AWB. As a result, higher-income and affluent families would be able to purchase higher quality education and other habilitation and rehabilitation services for the AWB. This, in turn, can nurture their resilience better. This result aligns well with the findings coming from other contexts where positive associations between income and resilience were found in a pattern in which lower-income is to be associated with a lower level of resilience [61, 62] and higher income to be associated with higher levels of resilience [34, 50, 60].

## CONCLUSION

This study brings out a comprehensive picture of the status of AWB's resilience, the extent of risk, and protective factors currently operating upon them under the present context of Addis Ababa, Ethiopia. Adolescents having blindness currently living in Addis Ababa are less resilient. They are faced with umpteen risk factors at home, school, neighborhood, community, and societal levels. They also lack protective resources that are expected to help them counterbalance the risk factors they encounter at each level of the environment so that their resilience is enhanced. The resilience of AWB, risk, and protective factors that prevail in their lives are related systematically. While risk factors hamper resiliency, protective resources nourish it.

Further, in Addis Ababa's context, the presence of risk factors indicates the absence of protective factors. The risk factors found at the five subsystems of the environment and the protective resources found at the same subsystems jointly account for 89.3% of the variance in the resilience of AWB. While risk factors negatively contribute to resilience, protective factors predict resilience positively. Gender has a significant influence on resilience; male AWB is more resilient than female adolescents. Adolescents with adventitious blindness are more resilient than those with congenital blindness, indicative of the influence played by the time of onset of blindness in resilience development. Mothers', as well as fathers' education positively, contribute to the resilience of AWB. Family income also influences AWB's resilience in a manner in which higher family income goes with higher resilience and vice versa.

This study's findings highlight the tremendous influence that environmental factors exert on the development of AWB's resilience. Though there may be certain resilience characteristics that an individual is born with that are instrumental in buffering against risk and adversity, the huge role of risk and protective factors found at various levels of the environment in resilience development is well established in this inquiry. Further, these risk and protective factors are differentiated by context and demographic characteristics of people with blindness, and thus they are subject to change. This

has substantial implications for all the habilitation and rehabilitation efforts. Helping persons with blindness to live independently and productively as much as possible in society is the ultimate objective of any rehabilitation and habilitation efforts. The philosophy of quality of life underpins such efforts too. They can be achieved only if the resilience of persons living with blindness is enhanced. Here comes the contribution of this investigation. Since risk factors at different environmental levels impede resiliency, reducing or eliminating these risk factors to the fullest possible extent would go a long way in strengthening resilience. The positive contribution of protective resources at the five levels of the environment implies that the rehabilitation and habilitation efforts should place an extra thrust on developing and/or introducing protective resources at every environmental subsystem. The study's findings also highlight the importance of examining and re-examining how the school systems in Ethiopia work with AWB as school risks are the major negative and positive predictors of resilience. An integrated effort to reduce risk factors and promote protective resources at home, school, neighborhood, community, and society through the different wings of disability-related services to build an inclusive society is the pertinent implication of this study. AWB who live and operate in such a society would naturally be more resilient, which would enhance the quality of their lives.

## AUTHORS' CONTRIBUTIONS

The first author has done a review of the literature and supervised data collection. The second and third author have done the write-up. All the authors jointly designed the study, proposal development, instrumentation, and data analysis.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The author confirms that no ethical approval was taken. In Ethiopia, it is not required.

## HUMAN AND ANIMAL RIGHTS

Not applicable.

## CONSENT FOR PUBLICATION

Written, informed consent was obtained from each participant prior to collecting data.

## AVAILABILITY OF DATA AND MATERIALS

The data and materials used to support the findings of this study are available from the corresponding author [M.M.S] upon reasonable request.

## FUNDING

None.

## CONFLICT OF INTEREST

The author declares no conflict of interest, financial or otherwise.

## ACKNOWLEDGEMENTS

Declared none.

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