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Mental and Physical Well-Being as Predictors of Loneliness Among Orphaned Adolescents in Delhi, India

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ABSTRACT

Loneliness is considered an important social and mental health issue in adolescence, especially for adolescents whose family lives have been disrupted or who are living in institutions. The cross-sectional study included 85 adolescents aged 13–18 years in Delhi, India, who were orphans and were then investigated for the relationship between mental health, physical health, and loneliness. The Warwick-Edinburgh Mental Wellbeing Scale (14 items) was used to measure mental well-being; three items adapted from the BBC Subjective Well-Being Scale were used to measure physical well-being, and an 11-item De Jong Gierveld Loneliness Scale was used to measure loneliness. The reliability of the scale was found to be very high for mental well-being (Cronbach's alpha = .921), high for physical well-being (alpha = .804), and moderate for loneliness (alpha = .644). Loneliness was negatively correlated with mental well-being ($r = -.361$, $p < .001$), and physical well-being was also negatively correlated to a lesser degree ($r = -.240$, $p = .027$). The multiple regression model was significant, $F(2, 82) = 6.41$, $p = .003$, $R2 = .135$. Mental well-being made a statistically significant unique contribution to predicting lower loneliness (B = -0.095, beta = -.445, $p = .008$); meanwhile, physical well-being did not make a unique significant contribution (B = 0.094, beta = .107, $p = .515$), after mental well-being was controlled. Findings suggest a need for psychological support and social connection in services for youth without parents, as well as caution about cross-sectional prediction, and a need for culturally and contextually appropriate and validated measures.

KEYWORDS: *adolescent loneliness, orphaned adolescents, mental well-being, physical well-being, India*

INTRODUCTION

Adolescence is a developmental phase in which social belonging, peer relations, autonomy, and emotional regulation become more significant. Loneliness is not necessarily the lack of social interactions. It represents a gap between ideal and actual social relationships and is now known as a public health issue since it is linked to mental, physical, and functional well-being (World Health Organization [WHO], 2025). Loss of parent-child attachment and continuity of care and support can heighten the risk of

emotional and interpersonal problems among adolescents who are out of the home or placed in institutional care.

Research on children and youth in institutional care has shown that these youth have higher rates of developmental, behavioral, and emotional problems. A systematic and integrative review found that institutionalization is linked to a wide range of developmental risks, but that the impact of institutionalization depends on the quality, length, and timing of institutional placement (van IJzendoorn et al., 2020). Kaur et al. (2018) identified clinically significant behavioral and emotional problems among children in institutional care facilities in India, and Mahanta et al. (2022) reported nutritional and psychosocial issues among children who live in Assam orphanage homes. A recent systematic review of children and adolescents in India also highlights broader depression, anxiety, social and behavioural issues, and psychological distress in adolescents (Balamurugan et al., 2024).

Loneliness is closely linked to good mental health and emotional functioning during adolescence. Lyyra et al. (2021) showcased a close relationship between loneliness and reduced mental well-being for 15-year-olds in four Nordic countries. Moreover, the longitudinal study indicates that loneliness, depressive symptoms, and social anxiety are related yet separate processes in adolescence (Danneel et al., 2020). Systematic reviews have also shown that loneliness in children and adolescents is linked to lower well-being and higher symptoms of depression and anxiety (Farrell et al., 2023). The results confirm the hypothesis that those adolescents who score higher on positive mental well-being are likely to score lower on loneliness.

Additionally, the link between loneliness and physical health is considered reasonable, albeit indirect. Poor self-rated health, sleep difficulties, and reduced physical activity are also linked to loneliness (Schrempft et al., 2019; Zheng et al., 2024). Social isolation among adolescents is also found to be correlated with reduced physical activity and increased sedentary time in large multi-country adolescent studies (Werneck et al., 2023). But physical health is related to mental health. That means that although there is a relationship between the measure of physical health and the measure of loneliness, this relationship will not account for further variance once mental well-being is considered.

There is limited research work specifically on loneliness among adolescent orphans in India. While the literature on loneliness in India is available, it tends to focus on general behavioral, emotional, nutritional, or psychiatric effects rather than the distinct role played by positive mental and physical health in the experience of loneliness. This present study fills this gap by studying both domains together in a sample of orphaned adolescents in Delhi. The analysis is designed as a cross-sectional prediction, or forward-looking analysis, as all variables are measured at the same time.

1.1 RESEARCH QUESTIONS AND HYPOTHESES

The main aim was to investigate the relationship between loneliness and the mental and physical well-being status of the orphans in Delhi, India. Three hypotheses were evaluated: (H1) mental and physical well-being would jointly explain significant variance in loneliness; (H2) mental well-being would uniquely and negatively predict loneliness after physical well-being was controlled; and (H3)

physical well-being would uniquely and negatively predict loneliness after mental well-being was controlled.

1. METHOD

2.1 DESIGN AND PARTICIPANTS

Table 1. *Demographic Characteristics of the Analytic Sample (N = 85)*

Characteristic	Category	n	%
Age	13-15 years	66	77.6
	16-18 years	19	22.4
Gender	Girl	44	51.8
	Boy	41	48.2
Education	Primary school (up to Grade 5)	6	7.1
	Middle school (Grades 6-8)	50	58.8
	High school (Grades 9-12)	26	30.6
	Drop-out / not attending	3	3.5

The research design chosen was a cross-sectional quantitative survey design, as shown in Table 1. The study records show that 138 people initially responded. However, only 85 complete cases were included in the analytic sample after being screened for eligibility, where 44 girls (51.8%) and 41 boys (48.2%) were included. Participants were aged 13 to 18 years (M = 14.51, SD = 1.72) and were living in Delhi. The selection criteria were that participants had lost both parents and were not living with another family member.

2.2 PROCEDURE

The data were gathered using a Google Forms Survey by a non-governmental organization from Delhi. According to the study record, the data collection began on 28th October 2025. There were no participants who did not provide affirmative consent in the analytic dataset. The purpose of the data collection was shared with support of the confidentiality statement; this includes the procedures of confidentiality for the survey. No documentation of an institutional ethics review or separate guardian consent procedures was found in the materials available; therefore, these should be documented and reported before submission to the journal.

2.3 MEASURES

Mental well-being. The 14-item Warwick-Edinburgh Mental Well-Being Scale (WEMWBS; Tennant et al., 2007) was used to assess mental well-being. The items are worded positively, and the options are marked on a scale from 1 (none of the time) to 5 (all of the time), giving a range between 14 and 70, with higher scores reflecting higher levels of positive mental well-being. WEMWBS has been shown to have good psychometric properties in adults and has been validated for use with adolescent school students (Clarke et al., 2011). The internal consistency of the present analytic sample was excellent (alpha = .921).

Physical well-being. Physical well-being was represented by three items from the physical-health domain of the BBC Subjective Well-Being Scale: satisfaction with physical health, sleep quality, and opportunity for exercise or leisure (Pontin et al., 2013). Responses were on a scale of 1 (not at all) to 5 (extremely) and could range from 3 to 15. The higher the score, the greater the perceived physical well-being. The internal consistency of the three-item score was good, alpha = .804. This variable should be treated as a short version of the perceived physical health index of the BBC, as only three items were used from the larger scale.

Loneliness. Loneliness was assessed with the 11 items derived from the de Jong Gierveld Loneliness Scale (de Jong-Gierveld & Kamphuls, 1985), five of which are positively worded social-connection items and six negatively worded items of loneliness. The original instrument has three response categories and dichotomous scoring: the middle response is considered a sign of loneliness. However, in the present survey, the response format was modified to five frequency categories. In this reanalysis, the published dichotomous logic was maintained, with some of them scored as 1 point for loneliness for the positively worded items and 1 point for the negatively worded items. Thus, loneliness scores ranged from 0 to 11, with higher scores reflecting more loneliness. The internal consistency was modest and acceptable for an exploratory study, $\alpha = .644$. This change in response format introduces a measurement limitation and needs to be validated in future studies.

2.4 DATA ANALYSIS

Firstly, descriptive statistics and Cronbach's alpha coefficients were computed. Pearson correlations were used to describe bivariate associations. Mental well-being and physical well-being were then entered into a simultaneous multiple linear regression to predict loneliness. Unstandardized coefficients (B), standard errors, standardized coefficients (beta), t tests, and p values were presented. The regression coefficients have been given confidence intervals in the text. R2, Adjusted R2, and omnibus F tests were used to summarize model fit. To check for multicollinearity, variance inflation factors (VIFs) were used; for independence of residuals, the Durbin-Watson statistic was used; for homoscedasticity, the Breusch Pagan test was used, and for functional form, the Ramsey RESET test was used. Residual normality was also assessed. A p-value less than .05 (two-tailed) was used as the criterion for statistical significance.

2. RESULTS

3.1 DESCRIPTIVE STATISTICS, INTERNAL CONSISTENCY, AND CORRELATIONS

As seen in Tables 2 and 3, which are shown below, Mental well-being scores ranged from 14 to 70 (M = 51.34, SD = 11.73), physical well-being scores ranged from 4 to 15 (M = 11.48, SD = 2.85), and loneliness scores ranged from 0 to 11 (M = 6.52, SD = 2.49). The correlation between mental well-being and physical well-being was quite high, with r = 0.780 and the value of $p < .001$. Mental well-being was negatively correlated with loneliness, with r = -0.361 and the value of $p < .001$. The bivariate negative relationship between loneliness and physical well-being was also smaller, with r = -0.240 and the value of p = 0.027. Therefore, at the bivariate level, the better well-being reported by the adolescents was correlated with lower levels of loneliness, as seen in Figure 1 below

Table 2: *Descriptive Statistics and Internal Consistency*

Variable	M	SD	Range	alpha
1. Mental well-being	51.34	11.73	14-70	0.921
2. Physical well-being	11.48	2.85	4-15	0.804
3. Loneliness	6.52	2.49	0-11	0.644

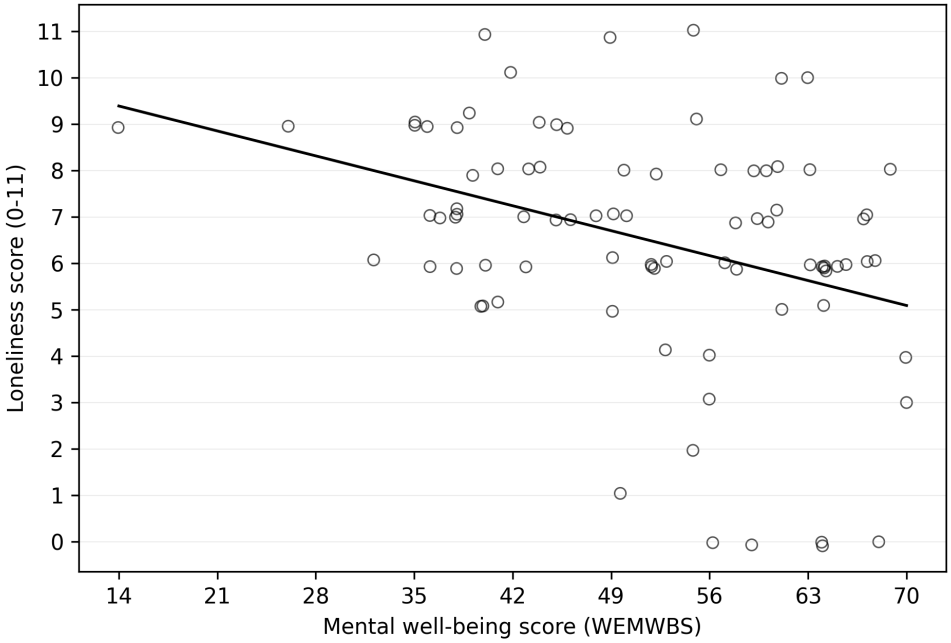
Note. N = 85. alpha = Cronbach's alpha.

Table 3: *Pearson Correlations Among Study Variables*

Variable	1	2	3
1. Mental well-being	-		
2. Physical well-being	0.780***	-	
3. Loneliness	-0.361***	-0.240*	-

Note. N = 85. * p < .05. *** p < .001.

Figure 1: *Association Between Mental Well-Being and Loneliness*



3.2 MULTIPLE REGRESSION

The simultaneous regression model was statistically significant, F(2, 82) = 6.41, p = .003, R2 = 0.135, adjusted R2 = 0.114. Mental and physical well-being jointly explained 13.5% of the variance in loneliness, supporting H1. Mental well-being was a significant unique negative predictor of loneliness, B = -0.095, SE = 0.035, beta = -0.445, t = -2.71, p = 0.008, 95% CI [-0.164, -0.025]. This result supports H2. In contrast, physical well-being did not uniquely predict loneliness after mental well-being was controlled, B = 0.094, SE = 0.143, beta = 0.107, t = 0.65, p = 0.515, 95% CI [-0.191, 0.379]. H3 was thus not supported at the unique-predictor level. These values can be seen in Table 4, as being compared to those collected from Mental well-being.

The fact that the bivariate effect on physical well-being is significantly different from the adjusted effect is significant. The correlation between physical well-being and loneliness was negative before the adjustment, but small, positive, and nonsignificant when mental well-being was included simultaneously. This is consistent with important commonalities between the two well-being predictors, rather than with evidence of a physical well-being-loneliness link.

Table 4: *Simultaneous Multiple Regression Predicting Loneliness*

Predictor	B	SE	beta	t	p
Mental well-being	-0.095	0.035	-0.445	-2.71	0.008
Physical well-being	0.094	0.143	0.107	0.65	0.515

Note. N = 85. Outcome = loneliness score (0-11). R2 = 0.135; adjusted R2 = 0.114.

3.3 REGRESSION DIAGNOSTICS

There was no extreme degree of multicollinearity observed, with VIF = 2.56 for both predictors, although there was a high degree of shared variance between mental and physical well-being (r = .780). Additionally, no significant residual autocorrelation was found, with a Durbin-Watson statistic of 1.77. There was no strong evidence of heteroscedasticity or functional-form misspecification since the Breusch-Pagan test was not significant, with chi-square(2) = 4.53 and p = 0.104, and the RESET test was not significant, F(1, 81) = 0.25 and p = 0.617. Residuals were not normally distributed (Shapiro-Wilk W = 0.944, p = 0.001). Inferences should be made with some caution due to the loneliness outcome being a bounded integer score and the sample being moderate-sized. Mental well-being remained significant, and physical well-being remained nonsignificant in a sensitivity analysis with robust HC3 standard errors.

3. DISCUSSION

The results describe the relationship between well-being and loneliness in this group of adolescent orphans very well. The overall model was statistically significant and explained 13.5% of the variance in loneliness. There was a negative correlation between higher mental well-being and lower loneliness at the bivariate level and when controlling for physical well-being. This finding is in line with the international adolescent evidence, which associates loneliness with lower positive mental health, feelings of depressive symptoms, lower self-esteem, and anxiety (Farrell et al., 2023; Lyyra et al., 2021). In addition, it resonates with the wider concept of social connection being a fundamental pillar of health and wellbeing, instead of a social product or consequence (WHO, 2025).

For the mental well-being coefficient, for every increase in WEMWBS score (while holding physical well-being constant), the loneliness score on the 0-11 scale was estimated to decrease by 0.095 points. As WEMWBS is spread across 56 score points in the observed data, there can be meaningful differences in predicted loneliness corresponding to differences in mental well-being. However, this is a cross-sectional model. The analysis struggles to conclude whether there is a causal link between better mental health and less loneliness, or whether loneliness leads to poorer mental health, or if both are affected by shared factors like quality of relationships, exposure to trauma, stability of caregiver relationships, peer support, and institutional climate.

Physical wellbeing is not as simply defined as in the original paper. The correlation between loneliness and its scores was found to be statistically significant and negative, consistent with other studies on

loneliness and its association with poorer physical health, less good sleep, and less activity (Zheng et al., 2024). But when mental well-being was added, physical well-being was not a very important unique predictor. The two predictors were highly correlated, indicating that worse mental health was associated with worse physical health. The physical well-being index may also have been too limited, as it did not measure activity or a variety of other physical health measures, such as chronic illness, nutritional status, functional limitation, or pain. This is perhaps why this unique contribution was small despite its direction of association with loneliness being in the predicted direction.

The results are also consistent with research with children and adolescents in institutional care. Indian evidence shows that emotional, behavioural, nutritional and psychosocial issues are significant concerns of young people living in institutions (Kaur et al., 2018; Mahanta et al., 2022). Evidence from around the world also highlights that institutionalization can impact development in several ways: the quality of care, the stability of relationships, the level of stimulation, and opportunities for secure attachment (van IJzendoorn et al., 2020). Therefore, interventions that aim to alleviate feelings of loneliness should not be restricted to methods focused only on coping skills. They should also focus on the social context for the development of relationships.

4.1 PRACTICAL IMPLICATIONS

For orphaned adolescents, programs could benefit from addressing mental health promotion along with intentional opportunities for positive social connections. These may involve regular checks for emotional distress or loneliness, provision of age-appropriate counselling, structured peer support and mentoring, relationship-focused staff training and regular recreational and group activities. The evidence indicates that interventions to address youth loneliness can be beneficial, but there is variability in the sizes of the effects, and there is a need for more robust and better-conducted trials (Burke et al., 2026; Eccles & Qualter, 2021; Osborn et al., 2021). Interventions used should therefore not be taken for granted to work and must be culturally adapted to the setting and needs of children in Indian childcare institutions.

4.2 LIMITATIONS AND FUTURE RESEARCH

There are several caveats to interpretation. First, the study sample was small and statistically limited to the setting of 85 adolescents in one NGO in Delhi, which meant that some generalizability and statistical power were restricted. Secondly, the cross-sectional design cannot be used to draw causal inferences or inferences about temporal order. Third, the self-report nature of all focal variables may create common method variance and response bias. Fourth, the physical well-being measure was only three items out of a larger scale and so was not a comprehensive assessment of physical health. Fifth, the De Jong Gierveld scale was used with a five-point frequency response format, instead of the original response format. Though the mapping was transparent and retained the original midpoint logic and achieved an alpha of ~.64, there is no formal evidence of the adapted scoring system being validated for this population. Sixth, there were non-normal residuals, and the loneliness outcome was bounded and discrete. Future studies should employ validated measures of adolescent loneliness or formally validate the adapted scale, and involve children across a range of childcare settings and NGOs, as well as objective or clinical measures of physical health, and longitudinal designs to clarify the directionality.

Future studies should also investigate mechanisms which could link well-being and loneliness. Perceived social support, peer connectedness, quality/caregiver connectedness, grief, trauma exposure, stigma, school connectedness, and length of institutional placement are among the candidate variables. As social connection and friend contact are linked to adolescent loneliness and physical health (Zheng et al., 2024), individual well-being and relational context could account for a great deal of variance beyond the scope of models that include only individual well-being scores.

4. CONCLUSION

Mental and physical well-being both predicted loneliness in this reanalysis of 85 orphaned adolescents in Delhi, with mental well-being being the only significant unique predictor in the simultaneous regression model. There was a small bivariate negative correlation between physical well-being and loneliness, but adding mental well-being did not add to the variance. The corrected statistics confirm the main finding in this sample: positive mental well-being is strongly associated with reduced loneliness; however, the association is not large enough to account for loneliness. Research and service should thus take into account the mental health of the individual, as well as the social circumstances in which adolescents are able to establish stable and meaningful relationships.

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