

## Psychological Correlates of Osteogenesis Imperfecta with Non-Osteogenesis Imperfecta Individuals

Nice Mary Francis P, Pavithra Joseph, and Sandra Soloman

Prajyoti Niketan College, Thrissur

Osteogenesis Imperfecta (OI) is an uncommon heritable disorder characterized by skeletal fragility and recurrent fractures. The present study was a comparative analysis of the psychological correlates in Osteogenesis Imperfecta and non-Osteogenesis Imperfecta individuals. Within the age range of 18–60 years, the study sample consisted of 60 participants (30 individuals having OI and 30 individuals not having OI), from across Kerala. In order to measure depression, anxiety, social support, and resilience, the study utilized Beck Depression Inventory-II, State-Trait Anxiety Inventory, Multidimensional Scale of Perceived Social Support, and Resilience Scale, respectively. To analyze the data collected, the descriptive statistics, an independent sample t test, and Pearson's correlation were used. The levels of depression were found to be significantly higher than anxiety, perceived social support, resilience among in osteogenesis imperfecta compared to non-osteogenesis imperfecta group. Depression and anxiety has a significant negative correlation with resilience and perceived social support.

**Keywords:** Osteogenesis imperfecta, Depression, Anxiety, Perceived social support, Resilience.

Osteogenesis imperfecta (OI) is an uncommon congenital disorder that presents with weakened bones, a high incidence of skeletal fractures and multiple comorbidities. It is often associated with defects in type 1 collagen biosynthesis (Van Dijk et al., 2010). OI is estimated to affect one in every 15,000 to 20,000 births (Forlino et al., 2011). From mild to severe, it has been traditionally categorized into four types, also current research has identified additional clinical types (Hill et al., 2019). Beyond fractures, OI induces pain, fatigue, weak muscles and other anatomical anomalies (Basel & Steiner, 2009), which has a detrimental impact on the mental health of patients, leading to psychological distress (Lai et al., 2023).

Anxiety is a future-oriented mood state defined by a lack of preparedness for upcoming negative events (Barlow, 2000). Musculoskeletal pain is a key contributor to

anxiety, impairs emotional and physical functioning of patients with OI (Barlow et al., 2022). Several factors/determinants including future fractures, mortality, medical procedures, hospitalization and recovery exacerbate anxiety and distress in individuals with OI (Hill, Baird, & Walters, 2014; Rork et al., 2023; Santos et al., 2018). A recent study by Smyth et al. (2023) found that medical service postponements during the pandemic triggered anxiety in OI patients.

Depression is a severe illness characterized by persistently poor mood, anhedonia and disinterest in activities (World Health Organization, 2020). Carmony (2004) found that juveniles with OI had disappointments, reduced academic performance, feelings of isolation, exhibited denial and manic defenses. They often suffer from distress and negative moral experiences followed by a perceived exclusion from care

by health care professionals (Wang et al., 2022) underscores the need for social support in management of OI.

Perceived social support, defined as the individual's sense of support available from interpersonal relationships (Cohen & Hoberman, 1983), has been associated with academic, social, and emotional well-being in individuals with OI (Clark & Malecki, 2023). Adequately supported patients comply with treatment regimens and attain positive outcomes. Strong connections with health care professionals and families who have had similar experiences enable them to access medical information, encourage self-advocacy and promote hospital visits (Ablon, 2003; Dogba et al., 2013). Research has shown that multidisciplinary care techniques improve function, independence, social engagement, and healthy living in patients with OI (Marr & Seasman, 2017). Kurtanova et al. (2022) discovered that social and psychological rehabilitation programs have a positive impact on self-esteem and anxiety reduction in OI patients.

Resilience is defined as a sustained positive adaptation during adversity (Wagnild & Young, 1993). Patients with OI, as shown in prior studies, exhibit unique strengths that distinguish them from healthy individuals. These strengths include adjusting to challenging circumstances, communicating their needs and maintaining a constructive outlook on their condition (Ablon, 2003). Research has shown academic and professional competence, behavioral conduct, occupational adaptability and the capacity to manage routine in OI sufferers (Kok et al., 2007; Männi, 2023; Wekre et al., 2009; Widmann et al., 2001). Understanding factors contributing to mental well-being in individuals with OI is crucial. Resilience and perceived social support enhance coping strategies and foster a positive attitude toward illness.

While biomedical aspects of OI have been extensively studied, there is a paucity of research on psychological aspects in current literature. Despite numerous studies on psychosocial factors and quality of life, there is a dearth of research on depression, anxiety, resilience, and social support in OI, particularly in the adult population of Kerala.

### **Objective**

The study was aimed at understanding psychological variables, viz., depression, anxiety, social support, and resilience, among osteogenesis imperfecta and non-osteogenesis imperfecta persons and also to determine the relationship between these variables.

### **Hypotheses**

1. There is no significant relationship between depression, anxiety, perceived social support, and resilience in osteogenesis imperfecta and non-osteogenesis imperfecta.

2. There is no significant difference between osteogenesis imperfecta and non-osteogenesis imperfecta participants in psychological variables viz; depression, anxiety, perceived social support and resilience.

### **Method**

#### **Participants**

The study comprised two groups: Osteogenesis imperfecta (OI) group and non-osteogenesis imperfecta (non-OI) group. 60 participants aged between 18-60 years were recruited through random sampling in which 30 were diagnosed with OI by a medical officer based on the ICD-10 criteria and 30 non-OI participants from the general population, who are demographically matching to the patient group are included in the study. Those who are willing to grant informed consent have participated in the study. The study excludes participants with

physical and psychological conditions, as well as those under 18 and over 60 years old.

### Measures

*Beck Depression Inventory-II (BDI-II)*: was a 21-item self-report indicator of depression developed by Aaron T. Beck. The scale was scored from 0 to 3, with a maximum score of 63. Scores between 14 and 19 suggest mild depression, 20 and 28 indicate moderate depression, while 29 and 63 indicate severe depression. The scale has convergent and divergent validity with an Internal consistency score of 0.93 and test-retest reliability score of 0.73 to 0.92 indicate the scale is reliable (Beck et al., 1993).

*The State-Trait Anxiety Inventory (STAI)*: was a 40 items inventory designed to measure state and trait anxiety by Charles D. Spielberger in 1983. The scale consists of S-anxiety and T-anxiety items. Total scores may range between 20 to 80. High values indicate high anxiety, while low scores suggest an absence of anxiety. The scale demonstrates strong reliability, construct and concurrent validity (Spielberger et al., 1983).

*The Multidimensional Scale of Perceived Social Support (MSPSS)*: was developed by Gregory D. Zimet to assess subjective social support. This 12-item self-report questionnaire consists of three subscales: significant others, family, and friends. A total score of 1 to 2.9 indicates low support, 3 to 5 is moderate support, and 5.1 to 7 is high support. The scale has acceptable reliability with a test-retest reliability coefficient score of 0.85 and strong factorial and construct validity (Zimet, 2016).

*Resilience Scale*: was a scale invented by Wagnild and Young in 1993 to measure resilience. This 25-item instrument was scored from 1 to 7 that is strongly disagree to strongly agree. The total score ranges from 25 to 175. Scores above 145 indicate moderate to high resilience; scores between

125–145 indicate moderate resilience; and scores of 120 and below indicate less to very little resilience. The scale has adequate reliability, concurrent and construct validity (Wagnild & Young, 1993).

### Procedure

Thirty osteogenesis imperfecta patients were selected from Amrithavarshini Charitable Trust for Osteogenesis imperfecta in Trivandrum after obtaining permission from the authority. Personal interviews were conducted with the patients during which they were informed of the details and procured consent. For comparison, a representative sample of thirty non-OI participants, demographically matching to OI, were selected from different parts of Kerala. Data were collected after establishing rapport with participants. They have been assured that their information will remain confidential.

### Results and Discussion

To understand the psychological distress among the patients of OI, the depression and anxiety were measured by using above mentioned tools. The results are as follows.

Table 1. The frequency range of depression, perceived social support, resilience and anxiety among OI and Non-OI participants

Range of the study variables among OI and non-OI participants Range	Osteogenesis imperfecta (n=30)	Non-Osteogenesis imperfecta (n=30)
Depression		
Mild (14-19)	9	3
Moderate (20-28)	4	3
Severe (29-63)	2	0
Perceived social support		
Low (1-2.9)	1	0
Moderate (3-5)	14	9

High (5.1-7)	15	21
Resilience		
Low (120 & below)	7	3
Moderate (125-145)	10	15
High (above 145)	13	12
Anxiety		
Low (20-37)	19	21
Moderate (38-44)	11	9
High (45-80)	0	0

Note. N=60

The frequency range of depression, perceived social support, resilience and anxiety among OI and Non-OI participants is depicted in table 1. Depression was observed to be more prevalent in both moderate and

severe levels within the patient group, showing more noticeable psychological impact. Perceived social support was found to be almost similar to that of the normal population. Majority of the patient population were seeking adequate assistance, so they could cope with the physical limitation. Higher levels of resilience were observed within the patient group, revealing the presence of unique coping mechanisms. There was a discrepancy in the number of OI patients, who fall into the low category of resilience, suggesting the underlying health condition, coping skills, and social support systems. The osteogenesis imperfecta group has a higher score of moderate levels of anxiety compared with the non-OI group. Both groups show an absence of high anxiety levels, suggesting lower severity of anxiety. This may be attributable to the individual variations in responding to stressful situations.

Table 2. Mean, Standard Deviation and t-value of study variables among OI and Non-OI

Variables	Groups				N	t-value	p-value
	Osteogenesis Imperfecta (OI)		Non-Osteogenesis Imperfecta (Non-OI)				
	Mean	SD	Mean	SD			
Depression	12.8	8.109	8.77	5.888	30	2.205	0.032*
State anxiety	42.7	11.905	38.77	10.28	30	1.37	0.176
Trait anxiety	45.7	11.882	41.83	10.51	30	1.33	0.187
Perceived social support (total)	4.99	1.23	5.51	0.853	30	1.863	0.068
Significant others	4.6	1.35	5.32	0.932	30	2.395	0.02*
Family	5.55	1.33	5.74	0.882	30	0.629	0.532
Friends	4.88	1.51	5.51	0.986	30	1.898	0.063
Resilience	136.53	20.032	139.53	14.612	30	.663	.510

\*p<0.05

Mean, standard deviation and t-value of study variables among osteogenesis imperfecta and non-osteogenesis imperfecta are illustrated in Table 2. The results revealed a significant difference in depression

between OI and non-OI groups. OI patients had greater levels of depression than non-OI. The congenital bone condition, osteogenesis imperfecta, causes uneven bone formation, pain, recurring fractures,

and other complications. Young adults with OI experience substantial levels of psychological distress because of physical limitation and fear associated with fractures, which can affect their education, occupation, marriage and other daily activities. The study primarily included female young adults who were unmarried and unemployed. This may impact the increasing rates of depression. Conforming to the findings of earlier research by Shepherd et al. (2024) patients with OI reported greater anxiety and depression. On the contrary, Mc Donald et al. (2023) reported lower depression and anxiety levels in OI patients.

A significant difference was found in the perceived social support sub variable “significant others”, showing low social support from significant others (health care professionals, peer group, and others) in OI. The findings are intriguing as OI patients in the present study were selected from a charitable trust, provided all support required to make them self-reliant by organizing, training and assisting them in learning more effective coping strategies. This includes annual meetings, cultural programs, and providing small financial support. The OI patient group receives almost similar social support compared to non-OI in family and friend sub variables. This shows that they were not viewed as a burden by family and friends. Michalovic et al. (2020) noticed depression and problems with self-management in patients with low social support. Conversely, previous research showed that the support from significant others related to the well-being of OI patients (Shapiro and Lee, 2012). Overall, the study showed no significant differences in resilience, perceived social support and anxiety among OI and Non-OI participants.

Table 3. Correlation between Depression, Anxiety and Perceived social support.

	Depression	Anxiety trait	Anxiety state
Perceived social support			
Pearson correlation	-.807***	-.776***	-.749***
Sig(2-tailed)	.000	.000	.000
N	60	60	60

Note \*\*\*p< .001

Table 3 shows Pearson’s correlation between depression, anxiety, and perceived social support in osteogenesis imperfecta and non-osteogenesis imperfecta. From the table, perceived social support was found to have a significant negative correlation with depression ( $r=-.807$ ,  $p<.001$ ) and anxiety ( $r=-.776$ ,  $-.749$ ,  $p<.001$ ). When social support increases, depression and anxiety decrease correspondingly. The incurable orthopedic handicap osteogenesis imperfecta encompasses multiple fractures, prolonged skeletal pain, immobility and functional dependency. Therefore, individuals with OI are more susceptible to developing psychological distress. Social support is identified as a key component of psychological health, which helps people to cope with their problems. Subjective perception of support acts as a protective factor against psychological distress, unnecessary sufferings and may also result in positive treatment outcomes. Findings of the study align with previous research by Calysn (2002) revealed that social support alleviates depression and anxiety. Although, evidence from earlier research found a high depression and anxiety levels are linked to inadequate social support (Ahmadiéh-Yazdi.,2022; Lai et al., 2023).

Table 4. Correlation between Depression, Anxiety and Resilience in OI and Non-OI

	Depression	Anxiety trait	Anxiety state
Resilience Pearson correlation	-.798***	-.705***	-.740***
Sig(2-tailed)	.000	.000	.000
N	60	60	60

\*\*\*p<.001

Table 4 shows Pearson's correlation between depression, anxiety, and resilience among osteogenesis imperfecta and non-osteogenesis imperfecta. From the result, resilience was found to have a significant negative correlation with depression ( $r = -.798$ ,  $p < .001$ ) and anxiety ( $r = -.705$ ,  $r = -.740$ ,  $p < .001$ ). As resilience increases, the risk of experiencing depression and anxiety decreases. Resilience is a positive adaptation and harmonizing capability of an individual in the face of challenging circumstances. Living with osteogenesis imperfecta is both challenging and can be debilitating because this chronic condition demands meticulous attention to threats. Resilient OI patients adapt to their physical conditions. Hardships during early life gave them the ability to adapt more effectively to their physical limitations by increasing self-confidence, self-acceptance and reducing psychological distress. According to Tsimicalis et al. (2016), acquiring new skills and social connections facilitate in mitigating psychological distress and improve adaptation to OI. Dogba et al. (2013) discovered lower incidence of depression in OI patients with high resilience, educational and occupational achievements.

### Conclusion

The present study was the first to investigate psychological correlates, depression, anxiety, resilience, and perceived social support among OI and non-

OI within the context of Kerala. The results show a significant negative correlation between the study variables. Depression was more frequent in OI when compared to the normal population. The study emphasized the crucial function of social support and resilience in ameliorating psychological distress. Wider application of the findings is restricted because of small sample size and heterogeneous distribution of samples. Therefore, it is recommended to use a large sample size and a longitudinal approach in future research for comprehensive understanding of psychological factors associated with OI. Despite the limitations, findings from the study may assist policy makers, researchers, and health care professionals in diagnosis and formulation of new treatment approaches that promote individual specific care and positive patient outcomes. Implementing an adult oriented care system with a focus on transition is beneficial.

### References

- Ablon, J. (2003). Personality and stereotype in osteogenesis imperfecta: Behavioral phenotype or response to life's hard challenges? *American Journal of Medical Genetics*, 122A(3), 201–214. <https://doi.org/10.1002/ajmg.a.20257>
- Ahmadiéh-Yazdi, P. (2022). The Psychosocial Adjustment and Well-Being among Young Adults with Osteogenesis Imperfecta (Doctoral dissertation, Palo Alto University).
- Barlow, D. H. (2000). Unraveling the mysteries of anxiety and its disorders from the perspective of emotion theory. *American Psychologist*, 55(11), 1247–1263. <https://doi.org/10.1037//0003-066x.55.11.1247>
- Barlow, S., Dove, L., Jaggi, A., Keen, R., & Bubbear, J. (2022). The prevalence of musculoskeletal pain and therapy needs in adults with Osteogenesis Imperfecta (OI) a cross-sectional analysis. *BMC Musculoskeletal Disorders*, 23(1). <https://doi.org/10.1186/s12891-022-05433-3>

- Basel, D., & Steiner, R. D. (2009). Osteogenesis imperfecta: Recent findings shed new light on this once well-understood condition. *Genetics in Medicine*, 11(6), 375–385. <https://doi.org/10.1097/GIM.0b013e3181a1ff7b>
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for the Beck depression inventory-II*. San Antonio, TX: Psychological Corporation.
- Calsyn, R. J., & Winter, J. P. (2002). Social support, psychiatric symptoms, and housing: A causal analysis. *Journal of Community Psychology*, 30(3), 247–259. <https://doi.org/10.1002/jcop.10004>
- Carmony, R. (2004). Children and adolescents with brittle bones: How can they overcome their disability? [Empirical Study; Quantitative Study]. *Neuropsychiatrie de l'Enfance et de l'Adolescence*, 52(6), 422–429. Doi: 10.1016/j.neurenf.2004.07.004.
- Clark, K. N., & Malecki, C. K. (2023). Osteogenesis imperfecta. In American Psychological Association eBooks (pp. 429–436).
- Cohen, S., & Hoberman, H. M. (1983). Positive events and social support as buffers of life change stress. *Journal of Applied Social Psychology*, 13(2), 99–125. <https://doi.org/10.1111/j.1559-1816.1983.tb02325.x>
- Dogba, M. J., Bedos, C., Durigova, M., Montpetit, K., Wong, T., Glorieux, F. H., & Rauch, F. (2013). The impact of severe osteogenesis imperfecta on the lives of young patients and their parents – a qualitative analysis. *BMC Pediatrics*, 13(1). <https://doi.org/10.1186/1471-2431-13-153>
- Forlino, A., Cabral, W. A., Barnes, A. M., & Marini, J. C. (2011). New perspectives on osteogenesis imperfecta. *Nature Reviews Endocrinology*, 7(9), 540–557. <https://doi.org/10.1038/nrendo.2011.81>
- Hill, C. L., Baird, W. O., & Walters, S. J. (2014). Quality of life in children and adolescents with Osteogenesis Imperfecta: a qualitative interview based study. *Health and Quality of Life Outcomes*, 12(1), 54. <https://doi.org/10.1186/1477-7525-12-54>
- Hill, M., Lewis, C., Riddington, M., Crowe, B., DeVile, C., Götherström, C., & Chitty, L. (2019). Exploring the impact of Osteogenesis Imperfecta on families: A mixed-methods systematic review. *Disability and Health Journal*, 12(3), 340–349. <https://doi.org/10.1016/j.dhjo.2018.12.003>
- Kok, J., Ralph, Janse, A. J., Hans, Verbout, A. J., Castelein, R. M., & Raoul. (2007). Quality of life in children with osteogenesis imperfecta treated with oral bisphosphonates (Olpadronate): a 2-year randomized placebo-controlled trial. *European Journal of Pediatrics*, 166(11), 1155–1161. <https://doi.org/10.1007/s00431-006-0399-2>
- Kurtanova, Y. E., Meshcheryakova, E. A., Kharitonov, A. B., & Brilliantova, A. A. (2022). Possible Interventions to the Emotional and Personality Domains of Children and Adolescents with Osteogenesis Imperfecta in the Course of a Social and Psychological Rehabilitation Program. *Clinical Psychology and Special Education*, 11(1). <https://doi.org/10.17759/cpse.2022110103>
- Lai, X., Jiang, Y., Sun, Y., Zhang, Z., & Wang, S. (2023). Prevalence of depression and anxiety, and their relationship to social support among patients and family caregivers of rare bone diseases. *Orphanet Journal of Rare Diseases*, 18(1). <https://doi.org/10.1186/s13023-022-02611-3>
- Marr, C., Seasman, A., & Bishop, N. (2017). Managing the patient with osteogenesis imperfecta: a multidisciplinary approach. *Journal of Multidisciplinary Healthcare*, Volume 10, 145–155. <https://doi.org/10.2147/jmdh.s113483>
- Männi, K. (2023). *Understanding the occupational adaptation process of individuals with osteogenesis imperfecta and their families to promote participation and occupational engagement: A scoping review*. DIVA. <https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1794612&dswid=3511>

- Mc Donald, D., Mc Donnell, T., Martin-Grace, J., Mc Manus, G., & Crowley, R. K. (2023). Systematic review of health related-quality of life in adults with osteogenesis imperfecta. *Orphanet Journal of Rare Diseases*, 18(1). <https://doi.org/10.1186/s13023-023-02643-3>
- Michalovic, A., Anderson, C., Thorstad, K., Rauch, F., & Tsimicalis, A. (2020). Exploring the Perceived Self-management Needs of Young Adults with Osteogenesis Imperfecta. *Clinical Nurse Specialist*, 34(3). <https://doi.org/10.1097/NUR.0000000000000517>
- Rork, W. C., Hertz, A. G., Wiese, A. D., Kostick, K. M., Nguyen, D., Schneider, S. C., Shepherd, W. S., Cho, H., Members of the BBDC, Murali, C. N., Lee, B., Sutton, V. R., & Storch, E. A. (2023). A qualitative exploration of patient perspectives on psychosocial burdens and positive factors in adults with osteogenesis imperfecta. *American Journal of Medical Genetics. Part A*, 191(9), 2267–2275. <https://doi.org/10.1002/ajmg.a.63323>
- Santos, M. C. dos, Pires, A. F., Soares, K., & Barros, L. (2018). Family experience with osteogenesis imperfecta type 1: the most distressing situations. *Disability and Rehabilitation*, 40(19). <https://doi.org/10.1080/09638288.2017.1334236>
- Shapiro, J. R., & Germain-Lee, E. L. (2012). Osteogenesis imperfecta: effecting the transition from adolescent to adult medical care. *Journal of Musculoskeletal & Neuronal Interactions*, 12(1), 24–27. <https://pubmed.ncbi.nlm.nih.gov/22373948/>
- Shepherd, W. S., Wiese, A. D., Cho, H. E., Rork, W. C., Baig, M. U., Kostick, K. M., Nguyen, D., Carter, E. M., Members of the BBDC, Murali, C. N., Robinson, M.-E., Schneider, S. C., Lee, B., Sutton, V. R., & Storch, E. A. (2024). Psychosocial Outcomes of Pain and Pain Management in Adults with Osteogenesis Imperfecta: A Qualitative Study. *Journal of Clinical Psychology in Medical Settings*. <https://doi.org/10.1007/s10880-023-09991-z>
- Smyth, D., Hytiris, M., Kelday, C., McDonnell, C., Burren, C., Gardner, A., Mills, L., Parekh, S., Semler, O., Stewart, A., Ingunn Westerheim, Muhammad Kassim Javaid, Osborne, P. A., & Saad, A. (2023). Patient-reported experience of clinical care of osteogenesis imperfecta (OI) during the COVID-19 pandemic. *Frontiers in Public Health*, 10. <https://doi.org/10.3389/fpubh.2022.951569>
- Spielberger, C. D., Gorsuch, R., Lushene, R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Tsimicalis, A., Denis-Larocque, G., Michalovic, A., Lepage, C., Williams, K., Yao, T.-R., Palomo, T., Dahan-Oliel, N., Le May, S., & Rauch, F. (2016). The psychosocial experience of individuals living with osteogenesis imperfecta: a mixed-methods systematic review. *Quality of Life Research*, 25(8), 1877–1896. <https://doi.org/10.1007/s11136-016-1247-0>
- Van Dijk, F. S., Pals, G., Van Rijn, R. R., Nikkels, P. G. J., & Cobben, J. M. (2010). Classification of Osteogenesis Imperfecta revisited. *European Journal of Medical Genetics*, 53(1), 1–5. <https://doi.org/10.1016/j.ejmg.2009.10.007>
- Wagnild, G. M., & Young, H. M. (1993). Development and psychometric evaluation of the Resilience Scale. *Journal of Nursing Measurement*, 1(2), 165–178. <https://pubmed.ncbi.nlm.nih.gov/7850498/>
- Wang, Y. W., Carnevale, F. A., Ezcurra, M., Chougui, K., Bilodeau, C., Siedlikowski, S., & Tsimicalis, A. (2022). The moral experiences of children with osteogenesis imperfecta. *Nursing Ethics*, 096973302211056. <https://doi.org/10.1177/09697330221105635>
- Wekre, L. L., Frøslie, K. F., Haugen, L., & Falch, J. A. (2009). A population-based study of demographic variables and ability to perform activities of daily living in adults with osteogenesis imperfecta. *Disability and Rehabilitation*, 32(7), 579–587. <https://doi.org/10.3109/09638280903204690>



- Widmann, R. F., Laplaza, J. F., Bitan, F. D., Brooks, C. E., & Root, L. (2001). Quality of life in osteogenesis imperfecta. *International Orthopaedics*, 26(1), 3–6. <https://doi.org/10.1007/s002640100292>
- World Health Organization: WHO. (2020, September 16). *Depression*.
- Zimet, G. (2016, December). (PDF) Multidimensional Scale of Perceived Social Support (MSPSS) - Scale Items and Scoring Information. ResearchGate. [https://www.researchgate.net/publication/311534896\\_Multidimensional\\_Scale\\_of\\_Perceived\\_Social\\_Support\\_MSPSS\\_-\\_Scale\\_Items\\_and\\_Scoring\\_Information](https://www.researchgate.net/publication/311534896_Multidimensional_Scale_of_Perceived_Social_Support_MSPSS_-_Scale_Items_and_Scoring_Information)

**Pavithra Joseph**, M.Sc., Student, Department of Psychology, Prajyoti Niketan College, Thrissur, Kerala. Email: pavithrajoseph1997@gmail.com

**Sandra Soloman**, M.Sc., Student, Department of Psychology, Prajyoti Niketan College, Thrissur, Kerala. Email: solomansandra99@gmail.com

**Nice Mary Francis P**, PhD., Associate Professor, Department of Psychology, Prajyoti Niketan College, Thrissur, Kerala. Email: nicemaryfrancis@gmail.com