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Research Article

Paediatric Mental Health

Chemotherapeutic Drugs Induced Symptom Distress Among Pediatric Cancer Patients

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Abstract: Pediatric cancer treatment includes several chemotherapeutic drugs in combination with adequate supportive management. Symptom distress among pediatric cancer patients on chemotherapy interferes with treatment compliance. Poorly managed distress leads to the decline of the child's ability physically and mentally and deteriorates the quality of life. This paper shows the effect of chemotherapeutic drugs induced symptom distress, and the effect of early diagnosis in the management and improvement in the quality of life of pediatric cancer patients. For this study60, pediatric cancer patients aged between 10 to 18 years including both the gender were chosen using purposive sampling. Using the M.D. Anderson symptom inventory the symptom distress experienced by the pediatric cancer patients was assessed. The present quantitative cross-sectional study was conducted at the AIIMS, Raipur. The data were analyzed using the descriptive Statistical Package for Social Science Version 16 (SPSS 16). The categorical data was analyzed using chi –square test and the cut off p-value at ≤0.05. Among, the pediatric cancer patients 77.65% (SD 18.85) were experiencing severe symptom distress when on chemotherapy. Whereas 53.65 %(SD 9.63). of them experiencing the symptoms those disturb their activities of daily living in the last twenty four hours at p-value of ≤0.05. There is a need for an adequate support system from the school, social relationship, siblings, and health care team for improving the quality of life of pediatric cancer patients. Animal facilitated therapy, artistics expressions, medical play, procedural education, well organized home bound or school programs help the pediatric cancer patients to manage the symptom distress, thereby improving the treatment outcome. The specific supportive chemotherapeutic management is essential for the pediatric cancer patient's treatment compliance and prognosis. The health care team, especially nurses play a vital role in early detection of chemotherapeutic agents induced symptom distress and its management.

Keywords: Oncology, Chemotherapeutic drugs, Pediatric Cancer patient, symptom distress, Quality of life in cancer.

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1.INTRODUCTION

The chemotherapeutic drug used in the pediatric cancer treatment varies for different types of cancer and the symptoms experienced by the pediatric cancer patients and their compliance with treatment. Higher doses of chemotherapeutic drugs are preferred in acute myeloid leukemia with physician preferred combination of drugs in cycles. Whereas in acute lymphocytic leukemia, lower doses of chemotherapeutic drugs are used for longer duration of time, based on the symptom distress experienced by pediatric cancer patients. Cancer is an important cause of death among pediatric age groups. Symptom distress among the pediatric cancer patients makes them undergo a high level of suffering, poor health related quality of care, which interferes with their treatment compliance. The symptom distress and its management is a challenging task for the child, family, and the health care workers. Pediatric cancer places both parents and children at risk for psychosocial difficulties including a specific risk for diminished quality of life[1]. chemotherapeutic drugs affects the normal cells in the bone marrow and increases the risk of infections, causes bruising and bleeding due to poor platelet count and fatigue, due to lack of red blood cells in the early treatment phase. Hair loss, mouth sores, nausea, vomiting, bleeding, tingling sensation, numbness, fatigue, weakness in the limbs, risk for blood clot and seizure are other adverse events experienced with these chemotherapeutic drugs. Hence there is a need for adequate supportive symptom management. The long term effects of these chemotherapeutic drugs causes effects on the cardiovascular, neural, renal and reproductive system. Drugs such as bicarbonate, rasburicase, allopurinol, are found to be beneficial in the management of the symptom distress along with the fluid management of the child.[2] Whereas some pediatric cancer patients have long term effects on their growth and development, fertility related issues and occurrence of secondary cancer. Intrathecal chemotherapy causes troubles in thinking and seizure among pediatric cancer patients. Poorly managed symptom distress leads to the decline in the child's ability both physically and mentally and the quality of life deteriorates. It was reported that poorly managed stress leads to the development of depression. Depression will worsen the condition and reduce the survival period of the patients.[3] Symptom distress in pediatric cancer patients differs by disease type. For example, in acute lymphocytic lymphoma, the symptoms includes steroid induced side effects, procedural pain, and neuropathy. Combination chemotherapy with high dose of cisplatin has better effectiveness than standard dose of cisplatin.[4] The five most distressing symptoms were nausea/vomiting, fatigue, pain, anxiety, and sleep disturbance.[4] Hence, management of symptom distress is an important issue to be considered in the management of pediatric cancer patients. The younger and the middle-aged pediatric cancer patients, reported increased levels of emotional, family problems, and two-thirds of the samples reported high psychological distress, mostly emotional and physical problems and if identified earlier will help in optimizing the psychosocial and psycho ontological care of cancer.[5] The pediatric cancer patients have experienced around 219 distinct symptoms which were numerous and complex during and after treatment of cancer. Pediatric cancer patients uses different expressions to talk about their symptom experiences[6]. There is a need for exploring the relationship between the gender and the age group differences in the expression of symptom distress with the specific tool for measurement. Multicenter randomized clinical trials will save time and increases the sample size. There is a gap in the clinical research on the symptoms of pediatric oncology patients[7]. The key focus area includes informal and inconsistent symptom assessment, uniform measuring tools which are age-related and improved documentation of symptom distress at every clinical setting will further improve interventions[8]. In general practice, 25.4% of the symptoms were reported in a 'vague' manner, 'serious' in 50.0%, and 'alarming' in 19.0% of cases. Where vomiting was associated with central nervous system tumors, and pain in leukemia[9]. The most common symptoms of poorly managed stress reported include nausea/vomiting, fatigue, pain, anxiety, and sleep disturbances. However, the majority of these symptoms are either under diagnosed or undiagnosed by health care workers. Hence, there is a strong need to assess the psychological parameters along with the clinical assessment. There is a need for integration of pediatric palliative care in cancer care for symptom management, as it helps in the caregiver's health management strategies also. Hence, the present study aims to assess the chemotherapeutic drug induced symptom distress among pediatric cancer patients in order to identify early and manage it to improve the quality of life of pediatric cancer patients.

2. MATERIALS AND METHODS

2.1. Study design

The present study was an exploratory survey. The study used a quantitative research approach and a purposive sampling technique to recruit the pediatric cancer patients.

2.2. Setting

The study was conducted at All India Institute of Medical Sciences, Raipur, pediatric department, Raipur.

2.3. Study Population

Sixty pediatric cancer patients getting treatment for cancer chemotherapy at All India Institute of Medical Sciences, pediatric department Raipur, Chhattisgarh were part of the study. The following criteria were used to recruit the children.

2.4. Inclusion criteria

Boys and girls within the age group of 10-18 years who are diagnosed with Cancer (hematological /non-hematological) and undergoing chemotherapy, able to speak English or Hindi, and willing to participate in the study were included.

2.5. Exclusion criteria

Pediatric cancer patients, who are diagnosed with functional and organic psychiatric disorders and having clinical primary or metastatic diseases to the brain, history of motion sickness and seizure and sensory-perceptual alteration (Visual and auditory impairment) were excluded from the study.

2.6. Tool

Data was collected through a semi-structured Interview schedule. The pediatric cancer patient's responses were

documented by the researcher for collecting the demographic data of the participants. M.D Anderson's symptom distress inventory was used to collect the data.

2.7. Ethical considerations

The study was conducted after obtaining ethical clearance from the Institutional human ethics committee of Saveetha Institute of Medical and Technical Sciences (008/09/2017/IEC/SU) and the Institute Ethics Committee of All India Institute of Medical Sciences Raipur, Chhattisgarh (IEC Proposal No: AIIMS RPR/IEC/2018/205). The assent and informed consent was obtained from the Pediatric cancer patients and the parents as per the regulations of ICMR.

3. STATISTICAL ANALYSIS

The data were analyzed using the descriptive Statistical Package for Social Science Version 16 (SPSS 16). Descriptive statistics including frequency and percentage for categorical variables were used. For the continuous variables, standard deviation was used.

4. RESULTS

Tables 1 and 2 presents the demographic characteristic of the pediatric cancer patients. It is pertinent to note that, 11(18.33%) of the children were school dropouts either due to disease process or treatment. The physical parameters were normal in range among the Pediatric cancer patients including height and weight. There is no developmental delay among them, all have achieved the milestones normally. Average academic performance was observed in 54 (56.67%). 42(70%) of children were not having any comorbid illness. Patients were predominantly 26(43.33%) sanguine. 44(73.33%) children belong to nuclear families and to rural residences, 41(68.33%). It is pertinent to note that, the majority of the pediatric cancer patients 46 (76.67%) preferred a non-vegetarian diet pattern. Most Pediatric cancer patients had no comorbid illness other than cancer. The temperament of the pediatric cancer patients was predominantlysanguine 26 (43.33%), Choleric 22 (36.67%), melancholic 12(20%) as described by the parents.

Table 1:Demographic Distribution of the variables of the Pediatric cancer patients on cancer chemotherapy among the samples.

Demographic	profile	Pediatric cancer patients (n=60) n(%)
Age	10-14 years	25 (41.67%)
	15-18 years	35 (58.33%)
Gender	Male	31 (51.67%)
	Female	29 (48.33%)
Educational status	Illiterate	4 (6.67%)
	Primary level	20 (33.33%)
	Secondary level	23 (38.34%)
	Higher Secondary level	2 (3.33%)
	Drop out	11 (18.33%)
Height in cm	110 -120 cm	12 (20.00%)
	121 -140 cm	36 (60.00%)
	141 -160 cm	12 (20.00%)
Weight in Kg	< 20 kg	6 (10.00%)
	21-30 kg	15 (25.00%)
	31-40 kg	29 (48.33%)
	>40 kg	10 (16.67%)
Achievement of Milestones	Normal	60 (100.00%)
	Abnormal	0 (0.00%)
Academic Performance	Excellent	18 (30.00%)
	Average	34 (56.67%)
	Poor	8 (13.33%)

n=60, p≤ 0.005

Table -2: Demographic Distribution of the variables of the Pediatric cancer patients on cancer chemotherapy among the samples.

Demographic	Profile	Pediatric cancer patients (n=60) n(%)
Co- Morbid Illness Temperament of the Child	No	42 (70.00%)
	Yes	18 (30.00%)
	Sanguine	26 (43.33%)
	Choleric	22 (36.67%)
	Melancholic	12 (20.00%)
	Phlegmatic	0 (0.00%)
Type of Family	Nuclear family	44 (73.33%)
	Joint family	16 (26.67%)
Family Monthly Income	Below Rs5000	30 (50.00%)
	Rs.5001-10000	15 (25.00%)
	Rs.10000-20000	11 (18.33%)
	>Rs.20000	4 (6.67%)
Types of Residence	Urban	19 (31.67%)
	Rural	41 (68.33%)
Diet pattern	Vegetarian	14 (23.33%)
	Non Vegetarian	46 (76.67%)

n=60 p≤0.005

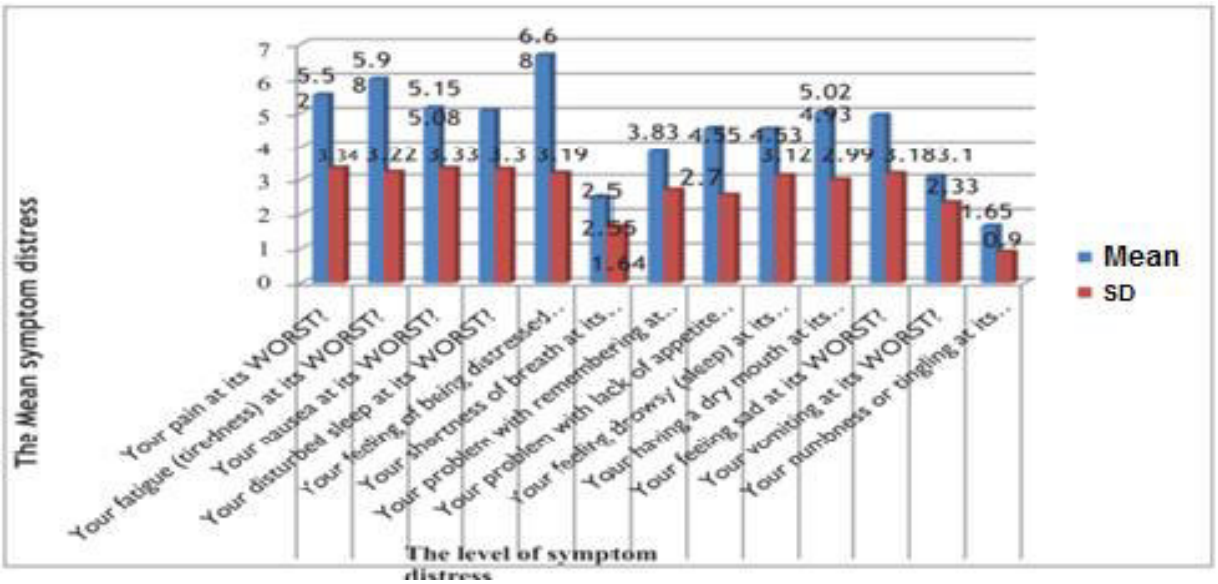

Fig 1: Bar diagram showing the percentage of mean symptoms distress score of how severe was the symptom distress among the Pediatric cancer patients undergoing on chemotherapy

Figure -1 presents the symptom distress score of the pediatric cancer patients.66.80% were reported as being distressed, fatigue (59.80%), dryness of the mouth (50.20%), and pain (55.2%), nausea (51.50%), and feeling sad (49.30%).

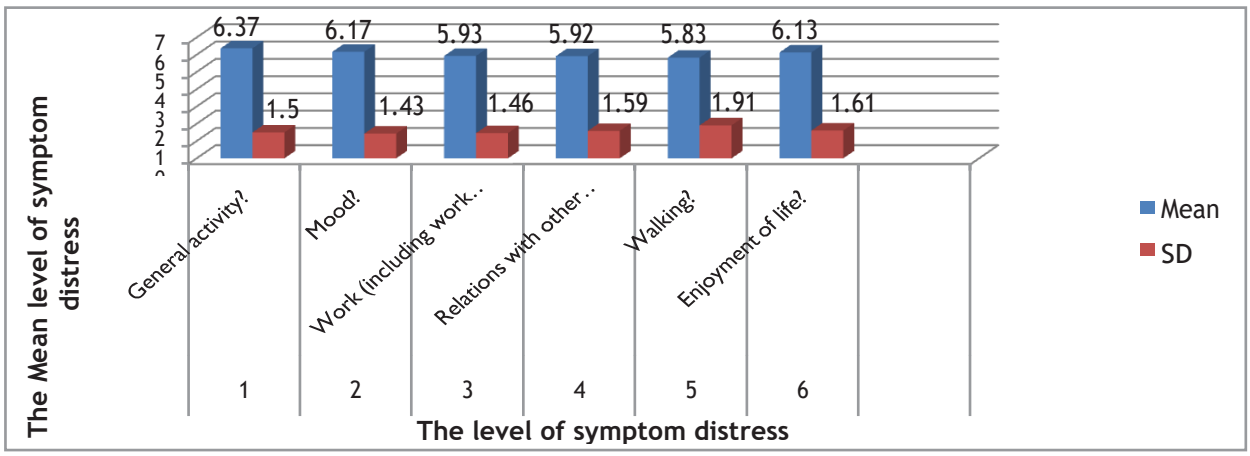

Fig -2 Bar diagram showing the percentage of mean symptoms distress score of how far the symptom interfered with the daily life in last 24 hours among the patients on cancer chemotherapy

Figure -2 presents the interference of symptoms in the daily life in the last 24 hours among samples majority of them had an interference with general activity (63.70%), mood (61.70%), enjoyment of life (61.30%) work (59.30%), relationship with other people (59.20%) and walking (58.30).

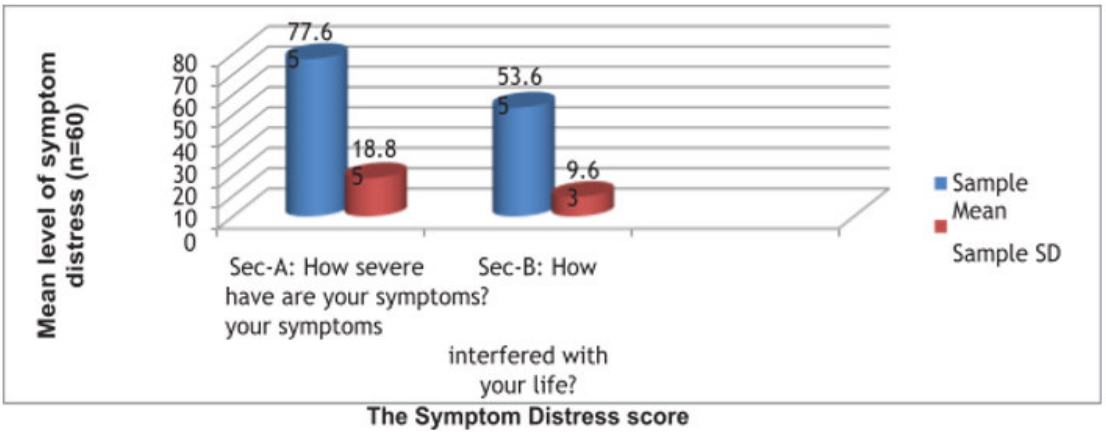

Fig -3 The mean level of symptom distress of the overall severity of the symptom and the symptom interfered with daily life in last 24 hours among pediatric cancer patients on chemotherapy

Fig -3 presents the mean level of symptom distress of the overall severity of the symptom was 77.65% (SD 18.85).The overall mean level of symptom distress in the last 24 hours was 53.65 %(SD 9.63). (Generalization of symptom distress score was calculated using a mean difference with 95% CI and proportion with 95% CI.).The study finding suggests that most of the pediatric cancer patients were experiencing severe symptom distress.

5. DISCUSSION

The present study aimed to show the effect of chemotherapeutic drugs induced symptom distress among pediatric cancer patients to frame the management strategy. Cancer survivorship research has increasingly suggested that cancer survivors exhibited remarkable psychological resilience despite multiple challenges. The present study results showed the mean level of symptom distress of the overall severity of the symptom to be 77.65% (SD 18.85) among pediatric cancer patients. The overall mean level of symptom distress among pediatric cancer patients in the last 24 hours was 53.65 %(SD 9.63). This suggested that , most of them are experiencing severe levels of symptom distress. It was, therefore, believed that there is a strong need for an effective intervention for the improvement of the quality of life of pediatric cancer patients on chemotherapy. The present study results are consistent with earlier studies which explained that, 82% of children reported at least 1 symptom and 47% reported less than three symptoms. The chemotherapeutic drugs make the patient susceptible for symptom distress due to the toxic effect of the drug on the normally dividing cells. Which necessitates extreme care, fluid replacement and adverse effect management.[10] The type of cancer varies with the race.[11] Lack of energy, numbness/tingling sensation, pain, difficulty sleeping, and nausea were the highest occurring symptoms with chemotherapy along with target therapy. Most of the time, pediatric cancer patients never verbalize, instead express non verbally as temper tantrums, odd behaviors towards parents and health care workers. The pediatric cancer patients, who underwent chemotherapy, had changes in sexual activity, change in the way food tastes, lack of energy, diarrhea, and lack of appetite were the symptoms with the highest score.[12] The most frequently reported physical symptoms were lack of energy (62%) , lack of appetite (60%) , pain (53%), constipation (40%), sleep problems (31%) and nausea/vomiting (29%). The most frequently recurring symptoms were sleep problems (72%), followed by lack of appetite (61%), lack of energy (55%) and nausea/vomiting (44%).The highest amount of distress was reported by patients with leukemia as per the literature.[13] Severe fatigue was a common late effect with cancer and affects daily life.[14] The pain conveyed by pediatric cancer patients differs with age and it needs multimodal therapies. Often, it is under-diagnosed or was not perceived by family members. Pediatric cancer patients experiences "Multilayered" pain due to organic symptoms on top of psychological factors like anxiety, depression, insomnia, and poor quality of life.[15] Gastrointestinal toxicity, was the reason for dose reduction, delay, and cessation of cancer treatment. It happens due to altered physiological changes like decreased stem cell reserve, decreased cell repairing ability and damage accumulation of body fat, and progressive loss of body protein.[16]Antracyclines are mostly associated with cardiac toxicity. The clinical symptoms varies from arrythmias and heart failure to completely asymptomatic. One of the studies on symptom prevalence using the memorial symptom assessment scale (MSAS) 10-18 items revealed the symptoms among the pediatric cancer patients ranged from 49.7% for lack of energy to 6.3% for problems with urination.[17] The disease progression and symptom distress are often underrecognized, which can lead to poor compliance and complications in pediatric cancer patients on different combination of chemotherapeutic drugs. FDA has approved 34 drugs covering 38 indications for treating childhood cancer and additional 6 therapies for preventing and mitigating adverse effects of cancer drugs[18]. Health care workers should be aware of the specific side effects experienced by the pediatric cancer patients. There is a linkage between the trauma of childhood chronic illness such as cancer and subclinical effects on a host of psychological (i.e., relationship quality, career choices, quality of life, cognitive appraisal mechanism, etc) and or biological (i.e. premature cell death, early health changes /vulnerabilities, etc) factors[19]. The study finding is consistent with an earlier study on children's and nurses' reports of symptoms were similar except, pediatric cancer patients reported significantly more frequency and intensity of pain.

Nurses are the primary care providers in the hospitals and can maximum assist in identifying specific effects of chemotherapeutic agents inducing the symptom distress on children and report the clinicians in planning the treatment. There is a need for partnering with the significant caretaker in eliciting the pediatric cancer patients, day to day issues to plan the care. The anxiety associated with the treatment progression and outcome of the treatment was left unaddressed. It is essential to explain the procedures, management of the expected side effects to the parents and pediatric cancer patients, proactively prepare them for undergoing the treatment, and withstanding the symptoms.[20,21] Drugs cannot distinguish selectively the cancerous cells.[22] There is a gap in the documentation of the symptom experienced and its follow up especially in developing countries , where there is an increasing prevalence of cancer due to various factors.[23] Management of pain using alternative therapies like massage, aromatherapy, transcutaneous electrical nerve stimulation, relaxation therapy, imagery exercise, immersion therapy distraction was found to be highly effective in pediatric cancer patients.[24] Animal facilitated therapy is beneficial in improving the psychical and mental health of the pediatric cancer patient by decreasing the pain, enhancing socialization and distraction, thereby decreasing fear and increasing pleasure among the patients[25]. Rational drug usage and adverse effect management is vital in every hospital.[26] The psychosocial support of the pediatric cancer patient is vital, especially procedural education. Information during treatment procedure, involving the children with medical play to families with the hospital equipment, siblings support programs, spiritual support through clergymen at the time of emotions turmoil can be availed. Memory based interventions and teaching healthy coping strategies have increased the survival rate of the pediatric cancer patients[27]. Parenting of a child with advanced cancer is strongly associated with high to severe levels of psychological distress. In contrast, psychological distress was lower among parents whose prognostic understanding was aligned with concrete goals of care.[28] Oncology management are accompanied by multiple negative and fatal adverse effects in childhood cancer.[29] Even though chemotherapy plays a vital role in cancer management, an efficient psychosocial support is essential for the pediatric cancer patient.[30] The present study was limited to 60 subjects at the selected set with the purpose to evaluate the expected symptom distress experienced by the pediatric cancer patients on chemotherapy. It will further help remedies to overcome the symptom. There is a need for a "prepared healthcare team with capacity building" for identifying and managing the symptom distress effectively. The finding is limited to one geographical area, and the samples were small. Future studies should focus on the larger sample with selected intervention to manage symptom distress, specific age group, and different staging of cancer.

6. CONCLUSION

The management of chemotherapeutic drugs induced symptom distress among pediatric cancer patients will bring a quantum of relief in the symptom distress among children undergoing cancer chemotherapy. Most of the pediatric cancer patient experienced interference with the general activity, mood changes, and lack of enjoyment in life, poor interpersonal relationship and compromised quality of life. The complains with chemotherapeutic agents depends completely on the chemotherapeutic drugs induced side effects and its management. Efficient health care team will able to identify and manage those symptoms based on the different type of cancer and the pediatric cancer patient individual vulnerability. Children's cannot handle cancer alone, unless until there is a good psychosocial support from the health care team. Effective management of chemotherapeutic drugs administration and monitoring will instill hope among the pediatric cancer patient for better survival and clinical outcome. Early identification of symptoms and its management will improve the treatment and the prognosis.

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8. AUTHOR'S CONTRIBUTION STATEMENT

Dr. K. Raman, Dr. Lokesh Kumar Singh, and Dr. Tushar Bharat Jagzape helped in conceptualizing and guiding the data collection. J. Jeayareka did the data collection and analyzing the data. All authors discussed the methodology and results and contributed to the final manuscript.

9. CONFLICT OF INTEREST

Conflict of interest declared none.

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