



ORIGINAL RESEARCH PAPER	Cardiovascular
CLINICAL EXPERIENCE-BASED DATA CHRONICLE: MULTICENTER EVALUATION OF CB ADVANCE IN NUTRITIONAL REHABILITATION FOR PEDIATRIC AND ADULT PATIENTS	KEY WORDS: Prescribing patterns, energy levels, glycemic control, fatigue, weakness, antioxidant, patient acceptance, convalescence, nutritional deficiency, diabetes, cognitive improvement.

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ABSTRACT	Background: Nutritional rehabilitation is crucial for both children and adults to prevent malnutrition related complications and support overall health. The present study was conducted to evaluate the efficacy of CB Advance in nutritional rehabilitation for pediatric and adult patients in a multicenter clinical setting. Methods: A questionnaire-based study was conducted among Indian healthcare professionals (HCPs) involved in nutritional rehabilitation. The study assessed prescribing patterns, indications, clinical benefits, patient acceptance, and HCPs perceptions of CB Advance's effectiveness in improving appetite, energy levels, and glycemic control. Results: A total of 45 HCPs participated in the study. Majority of them (88.9%) prescribed CB Advance for both adults and children, while 8.89% used it exclusively in pediatric patients. The CB Advance was mainly prescribed for convalescence and nutritional deficiency in adults (55.56% and 31.11%) and children (48.89% and 28.29%). Astaxanthin was commonly prescribed for its antioxidant benefits in PCOS (64.44%). Fatigue (75.56%) and weakness (17.78%) were key indications in adults, while weakness (53.33%) and fatigue (35.56%) were predominant in children. Clinical benefits were noted in elderly and diabetic patients, with 97.78% showing cognitive improvement and all diabetic patients demonstrating better glycemic control. Concomitant antibiotic use was reported in adults (73.33%) and children (71.11%). Appetite improved in 86.67% of patients. Acceptance was high, with 93.33% of adults preferring tablets and 95.56% of children favoring syrup or drops. The majority of HCPs recommended CB Advance for more than three months in adults (57.78%) and children (60.00%). All HCPs reported its effectiveness in glycemic control, energy enhancement, and nutritional rehabilitation. Conclusion: CB Advance was effective in nutritional rehabilitation, improving appetite, energy levels, glycemic control, and patient acceptance across all age groups.
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INTRODUCTION Nutritional rehabilitation refers to the process of restoring or optimizing nutritional status following illness¹. It is a critical aspect of patient recovery, particularly in those affected by malnutrition, which remains a common yet underrecognized and undertreated. Malnutrition is both a cause and consequence of disease, exacerbating morbidity and mortality across all age groups². Malnutrition arises from multiple factors, it results from both undernutrition and overnutrition, leading stunting, wasting, obesity, micronutrient deficiencies and other health related complication³. According to the NFHS-5 survey, 32.1% of children under five in India are underweight, 19.3% experience wasting, and 35.5% have stunting. Undernutrition remains a major contributor to the under-five mortality rate of 28 per 1,000. Additionally, 24.5% of the population is underweight, 24.1% are severely underweight, and 45% of children experience anthropometric failure³. Nutrition is a key modifiable factor in disease prevention and health promotion. A well-balanced diet ensures adequate energy and nutrient intake, supporting physiological needs while preventing deficiencies and excesses. Micronutrients are crucial for biochemical processes such as gene transcription, enzymatic activity, and oxidative stress protection^{4,5}. While dietary intake should ideally meet nutritional needs, supplementation is necessary in clinically indicated cases⁶. Proper nutrition in adults maintains energy and reduces the risk of cardiovascular disease, cancer, and diabetes⁷. Vitamin B plays a role in metabolic health. Vitamin D deficiency is associated with reduced insulin sensitivity, with evidence suggesting that calcium and vitamin D supplementation may lower the risk of type 2 diabetes⁸. Childhood malnutrition hampers growth, cognition, and immunity, increasing infection risk and long-term disease susceptibility. Adequate nutrition is crucial for development⁹. In the elderly, inadequate nutrition is a growing concern, contributing to increased disability, higher rates of institutionalization, and greater vulnerability to illnesses¹⁰. Reduced oral intake in perioperative patients can lead to metabolic disturbances, ERAS protocols emphasizing early nutritional intake to mitigate these effects. Multivitamin supplementation has shown potential benefits in pain management, wound healing, and recovery post-surgery¹¹. Astaxanthin (AST), a marine-derived carotenoid, exhibits potent antioxidant and anti-inflammatory properties, which may confer cardiovascular benefits. Oxidative stress and inflammation are key drivers in the onset and progression of heart failure, and astaxanthin has been suggested as a protective agent against these processes¹². A study reported that astaxanthin may improve lipid profile, although further clinical investigations in patients with coronary artery disease (CAD) are needed to establish conclusive evidence¹³. Therefore, the present study was conducted to evaluate the efficacy of CB Advance in nutritional rehabilitation for pediatric and adult patients in a multicenter clinical setting.	Methods Study Design This questionnaire-based study included Indian HCPs.
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Participation in the study was completely voluntary, and the study process, along with the data analysis, ensured the confidentiality and anonymity of the HCPs.

Study Questionnaire

The study questionnaire was designed based on existing literature, guidelines, and expert opinions. It consisted of a total of 19 questions focused on the prescription patterns, indications for use in various patient populations, clinical benefits, patient acceptance, and duration of treatment, concomitant medications, and overall effectiveness in improving appetite, energy levels, and glycemic control. The study protocol was approved by the independent ethics committee (ACEAS-Independent Ethics Committee, Ahmedabad, Date of approval: 12 Aug 2024).

Inclusion And Exclusion Criteria

HCPs with at least 5 years of experience in nutritional rehabilitation, managing both pediatric and adult patients requiring nutritional support, and prescribing CB Advance for a minimum of four weeks were included in the study. Those with less experience, cases where CB Advance was used for less than four weeks, and instances of incomplete or missing patient data were excluded from this study.

Data Collection

HCPs participating in the study were provided with a concise overview of the study's nature and the process for completing the questionnaire. The questionnaire was given to the HCPs either in person, via phone calls, or through online platforms, as per the HCP's convenience.

Table 1: Prescription Patterns And Clinical Observations Of CB Advance

Question	Options	Response (N=45)
Did you prescribe CB advances in both adults and children in these 10 patients?	All patients were children	4 (8.89)
	All patients were adults	1 (2.22)
	Patients included both adults and children	40 (88.9)
What is the indication for prescribing CB Advance tablets in your adult patients	Convalescence after illness/infections	25(55.56)
	Nutritional deficiency	14 (31.11)
	Post-stroke patients (nutritional rehabilitation)	2 (4.44)
	Patients with alcoholic liver disease	-
	Patients with poor immunity	1(2.22)
	Patients with depression & unbalanced diet	-
	Adults with recurrent respiratory infections	-
	Elderly	2 (4.44)
	Patients with NAFLD	-
	Women with PCOD	-
	Patients with fibromyalgia	-
	Athletes	1 (2.22)
What are the reasons for prescribing CB advance containing astaxanthin?	Potent antioxidant benefits improve health in women with PCOS	29 (64.44)
	Improves mitochondriol health which has implications in ALD, athletes.	9 (20.00)
	Reduces neuro degeneration in patients with diabetes	7 (15.56)
Did you observe improvement in cognition in elderly patients given CB advance containing astaxanthin?	Yes	44 (97.78)
	No	1 (2.22)
What is the indication for prescribing CB Advance syrups/drops in children?	Convalescence after an illness / infections	22 (48.89)
	Nutritional deficiency	13 (28.29)
	Picky eaters/ fussy eaters	-
	Children with poor immunity	6 (13.33)
	Children with recurrent respiratory infections	2 (4.44)
	Children with repeated infective diarrhea	2 (4.44)
What were the symptoms in the adult patients that made you prescribe CB advance?	Fatigue	34 (75.56)
	Diarrhea	-
	Dizziness	-
	Weakness	8 (17.78)
	Breathlessness due to anemia	3 (6.67)

Study Outcomes

The outcome of the study was to evaluate the effectiveness of CB Advance in nutritional rehabilitation for pediatric and adult patients across multiple centers, assessing its impact on energy levels, cognition in elderly patients, glycemic control in diabetes, appetite improvement, and the benefits of astaxanthin.

Data Analysis

The responses of HCPs were entered into Microsoft excel and descriptive statistics, such as frequencies and percentages, were employed to present data.

RESULTS

A total of 45 HCPs were included in this study. HCPs reported on the last 10 patients they treated, with the majority of HCP (88.9%) prescribing CB advance for both adults and children, while 8.89% prescribed it exclusively for pediatric patients. In adults, CB Advance was primarily indicated for convalescence following illness or infections (55.56%) and nutritional deficiency (31.11%). The most cited reason for prescribing CB advance containing astaxanthin was its potent antioxidant benefits in women with polycystic ovary syndrome (PCOS) (64.44%). Improvement in cognitive function was observed in 97.78% of elderly patients. In pediatric patients, CB advance was primarily prescribed for convalescence (48.89%) and nutritional deficiency (28.29%). Fatigue (75.56%) and weakness (17.78%) were the predominant symptoms prompting CB Advance use in adults, whereas weakness (53.33%) and fatigue (35.56%) were the most frequently reported symptoms in children (Table 1).

What were the symptoms in the children that made you prescribe CB advance?	Fatigue	16 (35.56)
	Diarrhea	-
	Dizziness	4 (4.44)
	Weakness	24 (53.33)
	Breathlessness due to anemia	3 (6.67)

Data presented as n (%).

Additionally, CB advance demonstrated clinical benefits in elderly and diabetic patients. CB Advance was found beneficial in all elderly patients with sarcopenia and all diabetic patients (Table 2).

Table 2: Usefulness Of CB Advance In Elderly Patients

Question	Options	Response (N=45)
Did you find CB advance useful in elderly patients with sarcopenia?	Yes	45 (100.00)
	No	-
Did you find CB advance useful in diabetic patients?	Yes	45 (100.00)
	No	-

Data presented as n (%).

HCPs reported that among the last 10 patients, concomitant antibiotic use was noted in both adults (73.33%) and children (71.11%). Improved appetite was observed in 86.67% of patients. HCPs reported high patient acceptance of CB Advance, with 93.33% of adults preferring tablets and 95.56% of children favoring syrup or drops. (Table 3).

Table 3: Concomitant Medications And Patient Outcomes

Question	Options	Response (N=45)
What were the concomitant drugs given in adults	Antibiotics	33 (73.33)
	Anti-diabetic drugs	12 (26.67)
	Antihypertensive drugs	-
	Cough formulations (expectorants and suppressants)	-
What were the concomitant drugs given in children	Antibiotics	32 (71.11)
	Anti histaminics for allergic disorders	-
	Cough formulations (expectorants and suppressants)	13 (28.89)
How many of these 10 patients reported improved appetite after CB advance treatment?	5/10	2 (4.44)
	6/10	1 (2.22)
	7/10	3 (6.67)
	>8/10	39 (86.67)
How was the acceptance of adult patients to CB advance tablets?	Excellent	42 (93.33)
	Good	3 (6.67)
	Fair	-
	Poor	-
How was the acceptance of children patients to CB advance drops or syrup?	Excellent	43 (95.56)
	Good	2 (4.44)
	Fair	-
	Poor	-

Data presented as n (%).

Table 4: Patient Acceptance And Duration Of Treatment

Question	Options	Response (N=45)
Did adults report improved energy levels after CB advance tablets treatment?	Yes	45 (100.00)
	No	-
Did glycemic control improve in patients with diabetes after CB advance treatment?	Yes	45 (100.00)
	No	-

Data presented as n (%).

The majority of HCPs recommended CB Advance for more than three months in both adults (57.78%) and children (60.00%) (Fig 1). All adults reported improved energy levels, and 100% of diabetic patients showed improved glycemic control (Table 4). Additionally, all HCPs considered CB Advance an effective formulation for nutritional rehabilitation (Fig 2).

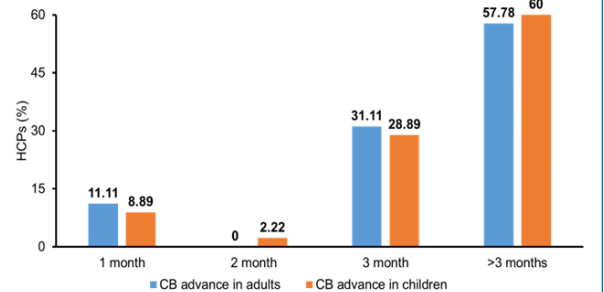


Fig 1: Recommended duration of CB Advance treatment

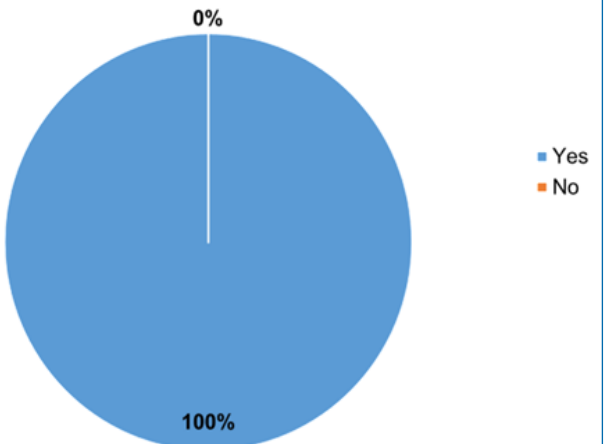


Fig 2: HCP Opinion On CB Advance As A Formulation For Nutritional Rehabilitation

DISCUSSION

The present questionnaire-based study successfully obtained insights into the clinical efficacy of CB advance in nutritional rehabilitation for pediatric and adult patients across multiple centers.

The present questionnaire-based study highlights the prescribing patterns and clinical benefits of CB advance in both pediatric and adult patients. The high prescription rate for both age groups (88.9%) suggests its broad utility in nutritional rehabilitation. This aligns with previous studies indicating the importance of micronutrient-enriched supplements in supporting recovery and overall well-being^{14,15}. Astaxanthin, a key component of CB Advance, was primarily prescribed for its antioxidant properties in women with PCOS (64.44%). Prior studies have reported that astaxanthin can reduce inflammation, improve insulin sensitivity, and support reproductive health in PCOS patients¹⁶⁻¹⁸.

Study conducted by CJJ et al demonstrated that antioxidants like astaxanthin can mitigate neurodegeneration, enhance cognitive function, and reduce the risk of dementia in aging populations. The present study also found that 97.78% of elderly patients receiving CB Advance with astaxanthin

experienced cognitive improvement¹⁹. The high usage of CB Advance in convalescence (48.89%) aligns with evidence showing that nutritional interventions can accelerate recovery post-illness by restoring depleted micronutrient levels²⁰. In adults, fatigue (75.56%) and weakness (17.78%) were the most common symptoms leading to CB Advance prescriptions. These findings are consistent with previously conducted research demonstrating that vitamin and antioxidant supplementation can improve energy levels, reduce oxidative stress, and enhance overall metabolic function²¹. Among pediatric patients, CB Advance was mainly prescribed for weakness (53.33%) and fatigue (35.56%), reinforcing the significance of nutritional supplementation in childhood growth and development. Previously conducted study has highlighted the role of essential vitamins and minerals in preventing deficiencies and improving cognitive and physical performance in children¹⁵.

Previous clinical studies have demonstrated that targeted supplementation with vitamins and antioxidants improves glycemic control, reduces diabetes-related complications, and benefits elderly patients with sarcopenia, aligning with the observed benefits in elderly patients in the current study^{22,23}. The concurrent use of CB Advance with antibiotics in adults (73.33%) and children (71.11%) suggests its role in supporting immune function and recovery during infections. Prior evidence indicates that nutritional support can enhance immune response and reduce the duration and severity of infections²⁴. Furthermore, the reported improvement in appetite (86.67%) is significant, as poor appetite is a major challenge in patients recovering from illness, and nutritional supplementation has been shown to enhance food intake and overall recovery considering the previously conducted study²⁵.

The long-term prescription of CB Advance for more than three months by most healthcare professionals (57.78% in adults, 60.00% in children) aligns with current guidelines advocating sustained nutritional interventions for optimal recovery and long-term health benefits²⁶. The high adherence to CB Advance, with 93.33% of adults preferring tablets and 95.56% of children preferring syrups or drops, suggests that formulation flexibility plays a crucial role in treatment compliance²⁷.

The widespread use of CB Advance by healthcare professionals highlights its growing role in nutritional rehabilitation. Further research with larger sample sizes and controlled trials is essential to strengthen these findings and expand its clinical applicability across diverse patient populations.

Limitations

The study has few limitations. A small sample size may limit the generalizability of findings, as the responses may not adequately represent the larger population of HCPs. The use of a self-reported questionnaire introduces the potential for response bias. The questionnaire may not cover all relevant aspects of the subject matter.

CONCLUSION

The responses from this questionnaire-based study indicate that CB Advance is widely used for nutritional rehabilitation in both adults and children. The findings highlight its role in convalescence, fatigue management, and cognitive improvement, particularly due to astaxanthin antioxidant benefits. Additionally, high acceptance rates and positive clinical outcomes reinforce its relevance in patient care.

Conflict Of Interest: All authors have no conflict of interest to declare.

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