Original Article

Imagery and Insight: A Qualitative Visual Analysis of Paediatric Cancer Patients' Drawings on Clinical Research Using the DRAWEP Framework

Rhea Aggarwal[1], Adarsh Keshari[2], Khushboo Sharma[3], Saisha Sehrawat[4], Haresh Gupta[5], Abir Aggarwal[6], Padam Singh[7], Pooja Sharma[8]

[1]M.B.B.S, Patient Advocate, PACER-India (Patient Advocates for Clinical Research, India), Co-Founder Apar health, Gurugram, Haryana, India, Orcid Id: 0009_0002_1635_6450, [2]Doctor of Pharmacy, Patient Advocate, PACER-India (Patient Advocates for Clinical Research, India), Senior Research Fellow, APAR Health, Gurugram, Haryana, India, Orchid Id: 0009_0005_2166_8303, [3]Program Co-ordinator, PACER-India (Patient Advocates for Clinical Research, India), Assistant General Manager, Paediatric Cancer Research Institute, CanKids KidsCan, New Delhi, [4]Patient Advocate, PACER-India, Summer Intern, APAR Health, Gurugram, Haryana, India. [5]Chief Program Officer- Medical Division, Paediatric Cancer Research Institute, CanKidsKidsCan, New Delhi, India, [6]Student Researcher, Patient Advocate, PACER-India, KLE College of Pharmacy, Belagavi, Karnataka, India, [7]Senior Biostatistician, APAR Health, Gurugram, Haryana, India, [8]MBBS, MD (Gyn), Program Lead, PACER-India, Founder & CEO, APAR Health, Gurugram, Haryana, India, ORCID ID: 0000_0002_6004_457X

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Abstract

Background: Paediatric assent and engagement in clinical research pose ethical and developmental challenges, particularly when research concepts are communicated primarily through verbal explanations. Visual methods such as drawing offer an alternative pathway to capture children's thinking and to better understand their unspoken perspectives.

Objective: To explore how paediatric cancer patients conceptualize clinical research and clinical trials through hand-drawn posters, using the Drawing-Based Emotional Processing (DRAWEP) framework supported by AI-assisted qualitative analysis.

Methods: This qualitative exploratory study involved secondary analysis of hand-drawn posters created by children during an International Clinical Trials Day (ICTD 2025) awareness activity conducted by a national paediatric oncology non-governmental organization. Posters were anonymized, digitized, and analyzed using the Drawing-Based Emotional Processing (DRAWEP) framework. AI-assisted tools were used to support structured thematic organization, with all interpretations reviewed and validated by human researchers.

Corresponding Author: Rhea Aggarwal, MBBS, Patient Advocate, PACER-India, Co-Founder, APAR Health, Gurugram, Haryana, India.

E-mail: rhea.agg2001@gmail.com

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The DRAWEP framework guided interpretation across the following domains: Description (what is drawn), Reflect (feelings or ideas evoked by the artwork), Analyze (insights into the child's understanding of research), Wonder (questions arising from the artwork), Evaluate (effectiveness of communication), and Present (summary insight).

Results: Six thematic domains emerged, reflecting emotional, relational, and symbolic representations of clinical research. Common themes included hope, trust, process awareness, and compassion. Several posters also revealed misconceptions, particularly the equating of research with a guaranteed cure (therapeutic misconception) and the conflation of clinician and researcher roles.

Conclusion: Visual expression through drawing provides a developmentally appropriate window into children's ethical and emotional perceptions of clinical research. Identifying both understanding and misconceptions through such methods may help inform the development of age-appropriate communication strategies in paediatric research settings.

Introduction

While clinical trials stand as the cornerstone of progress in paediatric oncology, having dramatically improved survival rates and quality of life [1], securing true assent from children remains a complex challenge to researchers. Additionally, understanding of clinical research among child participants remains variable and often shaped by external factors such as the opinions of their parents& friends.

Paediatric assent is the agreement of a child to participate in research, requires developmentally appropriate understanding concepts, including risks, side effects, and the distinction between research and clinical care, yet children's internal understanding of research concepts is rarely explored directly. [2].

Current communication methods often rely on simplified verbal explanations which frequently fail to achieve true conceptual understanding in children, especially concerning the uncertainty of experimental treatment [1, 3]. A critical barrier to informed assent is the difficulty children face in articulating abstract concepts and communicating their opinion verbally. [4].

Visual expression, such as drawing, is a methodology that by passes verbal barriers, allowing children to communicate much more easily [5]. Art-based methods have proven effective in health settings by offering a critical window into children's perspectives [6]. Drawings capture perceptions and meanings rather than factual knowledge and should be interpreted as expressive representations rather than indicators of cognitive mastery.

We employ the Drawing Based emotional processing (DRAWEP) framework combined with the objective, scalable quantification provided by AI-assisted image analysis.

This study sought to address the following questions:

1. How do paediatric cancer patients visually conceptualize clinical research and clinical trials on international clinical trials day?
2. What emotional, ethical, and relational meanings are reflected in their drawings?
3. What misconceptions or gaps in understanding are revealed through visual expression?

Methods

Study Design and Setting

This was a qualitative, exploratory visual study using secondary analysis of children's artwork. utilizing a single dataset of original artwork for analysis using the DRAWEP tool with the help of AI. The study utilized posters created during an ICTD 2025 awareness activity organized by an Indian paediatric oncology NGO. Participants represented multiple Indian states based on their current location.

Participants and Ethical Compliance

The data comprised hand-drawn posters collected from paediatric cancer patients aged 8–18 years during an International Clinical Trials Day (ICTD 2025) awareness event. The final dataset for analysis consists of posters received during the event- the posters were anonymized (all identifiers removed).

Participant Recruitment:

Participation in the poster activity was voluntary. No sampling or selection was performed. Participation in a clinical trial was not required.

Exposure to Clinical Research

Children were not required to have prior enrolment in clinical trials. Their representations may reflect indirect exposure through clinicians, caregivers, hospital environments, or awareness activities. The study therefore explores perceived understanding rather than verified knowledge.

Inclusion Criteria:

- Posters created by children aged 8–18 years who participated in the ICTD 2025 drawing activity. The broad age range was intentionally retained to capture developmental variation in visual expression.

Exclusion Criteria:

- Posters containing unremovable identifying information (faces, names, unique landmarks)
- Posters with image quality issues that prevent reliable analysis (e.g., extremely low resolution, damage, very light, illegible text) and cannot be recaptured.

Ethical Compliance

The poster-making activity was conducted as an awareness initiative. For research purposes, all posters were anonymized prior to analysis, with removal of any identifiable information. The study involved non-interventional, secondary analysis of visual data and posed minimal risk; participation was voluntary. No clinical or personal data were collected directly from participants. Demographic and clinical details reported in the results were taken from de-identified records to describe the study population.

The study protocol was reviewed, and a waiver of ethical approval and written informed consent was granted by the CanKids Institutional Ethics Committee (Reference No. IEC-CK-2025-07, dated 28 August 2025).

Data Collection Procedures and Drawing Prompt

The data consisted of digitized images of posters created on paper using any drawing materials (crayons, markers, pencil) during International Clinical Trials Day2025. Children were not provided with formal teaching or structured explanation about clinical trials prior to drawing. The intention was to capture their existing opinions as a snapshot.

Drawing Session Setup

Children were introduced to the activity by the staff of the paediatric cancer NGO. The single prompt provided was: "International Clinical Trials Day" Children were offered the choice to draw anything, and given the time of up to 1 hour.

Anonymization & Digitization

Prior to scanning/photographing, any visible names or identifiers were cropped or blurred. Each poster was digitized uploaded on to a secure password protected google drive folder

Analytic Framework: AI and DRAWEP Triangulation

Posters were analysed using the Drawing based Emotional Processing (DRAWEP) framework analysing the key themes, misconceptions, insights and poster highlights of posters in batches of 10 with the help of an AI-assisted analytic supportusing customized GPT.

The analytic prompt presented in the Appendix reflects the original protocol developed for the full dataset. Following application of inclusion and exclusion criteria, only 56 posters were included in the final analysis.

AI-assisted outputs were used to organize initial themes, which were reviewed by human researchers. Differences were resolved through discussion and consensus.

The DRAWEP tool guided interpretation includes- Description (what is drawn), Reflect (feelings/ideas that the artwork evokes), Analyse (Insights into the child's understanding of research), Wonder (questions arising from the artwork), Evaluate (effectiveness of communication), Present (a summary insight).

AI tools were trained on the DRAWEP framework, as elaborated above. AI outputs served to maintain consistency in interpretation, the thematic conclusions were reviewed, by human researchers before finalizing to reduce bias.

Data Management and Storage

All anonymized digital images were stored on a password protected Google Drive folder, accessible only to study leads.

Results

A total of 96 childhood cancer patients participated in the poster competition held during ICTD 2025. Their demographic and clinical profiles are summarized in Table 1. The mean age was 14.4 ± 2.95 years, median 14 (12–17), with a slight female predominance (54.2% girls). Older adolescents more frequently included textual or procedural elements, whereas younger children relied predominantly on symbolic imagery, showing the expected developmental variation in clinical trial representation.

Among the participants, acute lymphoblastic leukaemia (ALL) was the most common diagnosis (46.9%), followed by acute myeloid leukaemia (5.2%), Hodgkin's lymphoma (8.3%), and osteosarcoma (8.3%). Most participants (66.7%) were on active treatment, while 17.7% had completed therapy and 14.6% were in maintenance or survivorship phases.

Participants represented 16 Indian states and Nepal, with the highest numbers from Uttar Pradesh (25.0%), Delhi (16.7%), and Bihar (13.5%), reflecting broad geographic engagement.

After applying inclusion and exclusion criteria, 56 posters were included for final DRAWEP analysis.

The analysis, guided by the Drawing based Emotional Processing (DRAWEP) framework, confirmed that paediatric oncology patients conceptualize clinical research across six major interconnected themes, with a small number of drawings showed confusion or oversimplification, such as depicting research as an automatic cure (therapeutic misconception).

Thematic Conceptualization and Synthesis (Table 2)

Children's posters offered a unique lens into their understanding of complex scientific processes, ethics, and human experiences associated with clinical trials. The analysis revealed six major thematic categories:

- **Hope and Healing:** This theme dominated the visual narratives, using metaphors like rainbows, sunrise ("New Hope"), and bridges to health. Research was often viewed optimistically as a path to recovery.
- **Partnership and Trust:** Children strongly emphasized the relational aspects of trials. Research was visualized as a doctor-patient handshake ("Partnership") or a collaborative puzzle ("CURE"), highlighting a value for teamwork
- **Ethics and Fairness:** A surprising level of symbolic representationwas evident. Posters conveyed concepts of risk-benefit evaluation ("Side Effects vs. Benefits"), fairness (doctor with scales), and consent (e.g., "I say yes!").
- **Structured Process**: Children demonstrated an awareness of the procedural nature of trials, including representations of trial stages.
- **Compassion in Science:** This theme showed the depiction emotional care. Examples included a microscope lens shaped like a heart ("Care in Science") and the written concept of "Science with love".
- **Symbolism and Metaphors:** Abstract concepts were communicated via powerful symbolism, including research as a Treasure hunt ("Discovery!"), a Tree of science, or a Light bulb representing innovation.

Emerging Awareness

The visual narratives were indicative that the children often correlated research with cure, which may indicate that they did not fully understand the risks involved. (therapeutic misconception). Additionally, the clinician and the researcher were often one and the same in the posters, which may not always be the case.

Consistencies (Emotional and Relational)

Optimism and hope dominated the visual narratives. Children consistently associated research with new cures, innovation, and progress, and trust in doctors and researchers was portrayed positively.

Divergences and Agency

The artwork showed asplit in knowledge depth: some posters reflected trial knowledge using terms like phases of a clinical trial, while others relied on simplified metaphors such as rainbow syringes, which is likely due to the wide age range.

Importantly, the themes consistently highlighted children's depictions of themselves asking questions, imagining themselves as researchers, which indicates a preference for partnership rather than passive roles.

Role of Art in Communication

The use of art successfully demonstrated simplification, making abstract ideas graspable. Furthermore, the posters conveyed significant emotional depth and reached symbolic representation (weighing risks vs. benefits) that may be missed in purely verbal assessments. Direct quotes such as "I am part of a trial!" and "Partnership" highlight children's direct voices.

Overtly negative depictions of clinical research, such as fear or refusal, were uncommon. This may reflect the supportive context of the awareness event, and influence of parents/ caregivers and should not be interpreted as absence of concern.

Table 1: Profile of Childhood Cancer Patients Participating in the Poster Activity

Parameters	n	%
Gender		
Boys	44	45.8
Girls	52	54.2
Age		
09-11 yrs	24	25.0
12 - 15 yrs	29	30.2
more than 15 yrs	43	44.8
Mean ± SD	14.40 + 2.95	
Median (IQR)	14 (12 - 17)	
Types of cancer		
Acute Lymphoblastic Leukaemia (ALL)	45	46.9
Acute Myeloid Leukaemia (AML/APML)	5	5.2
Leukaemia (other/unspecified)	9	9.4
Hodgkin's Lymphoma (HL)	8	8.3
Osteosarcoma (OS)	8	8.3
Ewing Sarcoma / PNET	4	4.2
Soft Tissue Sarcomas (STS)	3	3.1
Other Carcinomas	5	5.2
CML (Chronic Myeloid Leukaemia)	1	1.0
CNS (Central Nervous System)	1	1.0
GCT (Germ Cell Tumour)	1	1.0
NHL (Non-Hodgkin's Lymphoma)	1	1.0
RB (Retinoblastoma)	2	2.1
Treatment Status		
Completed	17	17.7
Maintenance / Survivor	14	14.6
On treatment	64	66.7
Relapse	1	1.0
States		
Delhi	16	16.7
Bihar	13	13.5
Gujarat	5	5.2
J&K	1	1.0
Jharkhand	1	1.0
Madhya Pradesh	3	3.1
Maharashtra	8	8.3
Nepal	1	1.0
North East	2	2.1
Odisha	1	1.0
Punjab	1	1.0
Rajasthan	2	2.1
Tamil Nadu	2	2.1
UP	24	25.0
Uttarakhand	2	2.1
West Bengal	7	7.3

Table 2: Summary of Children's Conceptualizations and Emerging Themes

Batch	Key Themes	Broad Understanding	Surprising Insights	Notable Quotes / Poster Highlights
1	Hope, Healing, Support, Scientific Curiosity, Empowerment	Trials always cure; roles of doctor vs. researcher	Timeline of trial process, Graphs	*"I am part of a trial!"*, *"Trust"*, *"How we know it works"*
2	Procedures, Consent, Ethics, Fairness, Teamwork	Trials = universal cures; Research = hospital stay; Scientists as superheroes	Consent form, Pie chart, Poetic microscope-heart	*"Consent Form"*, *"Look inside"*, *"New medicine for all children"*

Cont.....

3	Process flow, Protection, Consent agency, Ethical balance, Compassion in science	Trials as guaranteed protection; Kids as researchers; Medicine always wins	Risk-benefit scale, Child consent voice, *"Science with love"*	*"I say yes!"*, *"Science with love"*, *"Which works better?"*
4	Structure, Data, Metaphors (bridge, tree, treasure), Curiosity, Learning	Research = guaranteed health; Discovery = guaranteed cure; Race = medicine always wins	Comparison of trial vs. standard, Data/tech, Tree of science	*"Data matters"*, *"Why?"*, *"Research is the bridge"*
5	Trial phases, Monitoring, Risk-benefit ethics, Global unity, Partnership	Trials = guaranteed cure; Kids as researchers	Phases of trials, Risk-benefit scale, Partnership handshake	*"Phase 1–3 clock"*, *"Side Effects vs. Benefits"*, *"Partnership"*
6	Hope, Future, Ethics, Compassion, Teamwork, Innovation	Trials always succeed; Cure as puzzle solved easily	Doctor balancing fairness, Microscope-heart, Future door	*"Care in Science"*, *"Future"*, *"CURE"*, *"New Hope"*

Discussion

Integrating AI for Visual Analysis (Appendix)

The methodological innovation of this study lies in the integration of a customized GPT-based artificial intelligence (AI) model within the DRAWEP framework to support interpretation of children's visual narratives. By combining natural language and image-based reasoning, this approach facilitated structured and transparent organization of themes and enables a structured, replicable analysis of children's perceptions of clinical research.

AI-assisted visual analytics is an emerging frontier in qualitative research, enabling pattern recognition, emotion inference, and thematic clustering at scale (8–10). Current frameworks emphasize AI output verified by humans AI, ensuring that AI outputs remain transparent, accurate and consistent (8, 11). Such hybrid models where AI augments but does not replace human judgment offer a pathway toward standardized, scalable visual communication assessment in paediatric research literacy studies.

Therapeutic Misconception in Paediatric Research Perceptions

The dominant theme of *Hope and Healing* across children's posters reflects emotional resilience as well as a potential therapeutic misconception, wherein participation in research is *perceived* as ensuring direct personal medical benefit (7, 12). This perception *appears to arise from* a conflation of clinical care and research roles, as seen in posters that depict the doctor, researcher, and scientist interchangeably. While expressions of optimism are developmentally understandable in paediatric oncology setting, it underscores a persistent ethical challenge in paediatric research communication.

Similar findings have been described in paediatric bioethics literature, where hope and trust often shape children's and families' understanding of research participation (7, 12). Addressing this requires developmentally sensitive communication that balances hope with honesty about uncertainty and experimental nature.

Educational interventions and materials should incorporate developmentally sensitive communication approaches- such as clearer role differentiation, balanced messaging around uncertainty, and age-appropriate visual explanations- all of which may help reduce therapeutic misconception:

1. Differentiate the roles of clinician and researcher clearly and repeatedly in both verbal and visual formats.

2. Balance optimism with transparency, preserving optimism while gently communicating that research may not guarantee cure.
3. Use child-friendly visual aids, metaphors, or illustrations distinguishing "experimental treatment" from "gold standard treatment."
4. Include comprehension checks, such as drawing or explaining back concepts, to identify and correct misperceptions early.

Broader Implications

This study demonstrates that AI-mediated visual interpretation, when guided by an evidence-based framework like DRAWEP, can uncover nuanced insights into how children conceptualize clinical research insights often inaccessible through verbal or survey-based approaches. Children's drawings revealed both ethical awareness (risk–benefit balance, fairness, consent) and misunderstanding (equating research with cure), offering valuable direction for findings highlight areas where communication may require clarification.

However, interpretive bias remains possible in both AI and human qualitative analysis, especially when evaluating culturally embedded or metaphorical imagery. Future studies should expand dataset diversity, and assess how visual-based educational interventions influence children's understanding longitudinally.

While it is well established that children often adopt the views of their caregivers or family members regarding research participation, it remains important to actively engage paediatric participants in discussions about clinical trials. Efforts should be made to communicate study aims and procedures in an age-appropriate manner and to involve children as meaningful partners in their own healthcare. Promoting such engagement, with due consideration of developmental capacity, supports respect for bodily autonomy and constitutes an ethical imperative in paediatric research.

Limitations:

Interpretations are based on secondary analysis of artwork created in a non-research setting. The wide distribution serves to achieve a broader understanding but may also muddy the results. The absence of standardized instruction, verification of research exposure, and the exclusion of some posters may limit generalizability. Findings should be interpreted as exploratory and descriptive.

In neutral or clinical contexts, children's visual narratives may include greater expressions of fear, uncertainty, or ambivalence. Future studies should explore visual representations elicited in routine clinical settings to capture a broader emotional spectrum.

Conclusion

Children's drawings provide valuable insight into how paediatric patients emotionally and symbolically perceive clinical research. Visual methods can complement traditional communication approaches by revealing both understanding and misconceptions, informing more developmentally sensitive discussions in paediatric research contexts.

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Ethical Clearance: All procedures followed were in accordance with the ethical standards of the institutional and/or national research committees and with the Helsinki Declaration and the ICMR National Ethical Guidelines for Biomedical and Health Research.

Ethics Approval: The study protocol was reviewed, and a waiver of ethical approval wasgranted by the CanKids Institutional Ethics Committee (Ref no. [IEC-CK-2025-07], dated[28th August 2025]).

Declaration of conflicts of interest statement: Authors declare no conflict of interests.

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