Youth-Participatory Visual Communication in Adolescent Substance Abuse Prevention: A Systematic Review

Agung Dwi Wicaksono*
Jurusan Ilmu Komunikasi, Universitas Brawijaya, 65145, Malang, Indonesia
agungdw@student.ub.ac.id

Desi Dwi Prianti
Jurusan Ilmu Komunikasi, Universitas Brawijaya, 65145, Malang, Indonesia
desidwip@ub.ac.id

Fitri Hariana Oktaviani
Jurusan Ilmu Komunikasi, Universitas Brawijaya, 65145, Malang, Indonesia
fitri.oktaviani@ub.ac.id

Abstract
Adolescent substance abuse remains a persistent global public health concern, shaped by developmental vulnerability, social influences, and increasing exposure to media-based messages, highlighting the need for effective and contextually relevant prevention strategies. Although visual communication has become a prominent component of prevention campaigns, evidence regarding its effectiveness and the role of youth participation, particularly through Youth Participatory Action Research (YPAR), has not been systematically consolidated. This systematic literature review examines how visual communication is implemented in adolescent substance abuse prevention, evaluates its effectiveness in influencing knowledge, attitudes, social norms, and behaviours, and explores the contribution of YPAR to campaign design and impact. Following PRISMA and Kitchenham guidelines, a comprehensive search was conducted across Scopus and Google Scholar using PICO-informed keywords. Peer-reviewed studies published between 2015 and 2025 in English or Bahasa Indonesia were screened using predefined inclusion and exclusion criteria. Methodological quality was assessed using the Mixed Methods Appraisal Tool (MMAT), and data were synthesized through thematic analysis

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supported by NVivo 14. A total of 36 studies were included. The findings indicate that static visuals, audio-visual content, and social media–based strategies dominate the literature and are consistently associated with improvements in knowledge, risk perception, attitudes, and social norms. Behavioural outcomes were less frequently examined. Participatory and YPAR-driven visual approaches, although limited in number, demonstrated strong potential in fostering youth agency, engagement, and empowerment. These findings underscore the importance of integrating participatory visual communication strategies to enhance the relevance and effectiveness of adolescent substance abuse prevention efforts.

1. Introduction

Adolescent substance abuse and substance use disorders continue to represent a complex public health concern that demands sustained global attention. Epidemiological evidence indicates that although declines have been observed for certain substances in specific regions, overall patterns of substance use remain variable and continue to impose a substantial health burden on this population group (Yu & Chen, 2025). The consequences of substance use extend beyond physical health outcomes, affecting cognitive development, emotional well-being, and adolescents' capacity to establish stable and productive life trajectories. These impacts underscore the importance of prevention strategies that address not only behaviour but also broader developmental and psychosocial processes. Consequently, adolescent substance abuse requires prevention approaches that are innovative, comprehensive, and grounded in robust empirical evidence.

Adolescence represents a critical developmental stage characterized by significant biological, cognitive, and social changes that may increase vulnerability to substance use. Processes related to identity formation, the desire for social acceptance, and heightened sensitivity to peer influence often serve as key drivers of experimental substance-related behaviours (Stritzel, 2022). Environmental conditions and prevailing community norms may further amplify these risks, particularly when adolescents lack adequate self-regulatory capacity and refusal skills. Without sufficient resilience and psychosocial resources, adolescents may be more susceptible to external pressures and risk-taking behaviours. A comprehensive understanding of adolescent psychosocial dynamics is therefore essential for designing effective substance abuse prevention strategies.

Despite the growing recognition of adolescent-specific vulnerabilities, many substance abuse prevention programs continue to rely on predominantly one-way, didactic communication approaches. Prevention messages are often delivered using overly formal language or visual styles that fail to resonate with adolescents' everyday experiences, limiting their ability to capture attention and sustain engagement. As a result, adolescents may perceive such campaigns as disconnected from their lived realities and insufficiently reflective of the social challenges they encounter. Empirical evidence suggests that prevention messages are more effective when they are tailored to adolescents' social contexts, linguistic preferences, and emotional experiences (Valdez et al., 2020). When adolescent perspectives are overlooked, engagement tends to remain low and may even result in resistance toward prevention messaging.

Within this context, visual communication has gained increasing attention as a promising modality for substance abuse prevention. Visual elements can capture adolescents' attention rapidly and facilitate the processing of complex information through more accessible and intuitive formats, such as posters, infographics, short videos, comics, and photographs. Theoretical perspectives from visual cognition and dual coding theory suggest that visually supported messages enhance comprehension and recall by engaging multiple cognitive pathways. In addition, emotionally salient visuals can strengthen message memorability and perceived relevance (Traboco et al., 2022; Galmarini et al., 2024). This makes visual communication particularly suited to adolescents, who are accustomed to consuming information through image-based and screen-mediated media environments.

However, the use of visual communication alone does not automatically ensure effectiveness in adolescent substance abuse prevention. Design quality, including clarity of information, balance between text and imagery, and the strategic use of color, plays a critical role in shaping how prevention messages are interpreted and evaluated. Moreover, visual narratives that incorporate relatable characters, authentic scenarios, and coherent storytelling structures are more likely to foster emotional engagement among adolescents (Lim et al., 2023). When these design elements are insufficiently considered, visual messages may be perceived as unengaging, inauthentic, or confusing. Consequently, thoughtful and youth-oriented visual design is essential to maximize the preventive potential of visual communication strategies.

To further address challenges related to relevance and engagement, the Youth Participatory Action Research (YPAR) approach offers a participatory framework for designing prevention messages. YPAR actively involves adolescents as partners in identifying issues, generating

data, and co-creating visual content that reflects their lived experiences (Valdez et al., 2020). This approach shifts adolescents' roles from passive recipients to active contributors, thereby enhancing the authenticity and contextual grounding of prevention messages. Through participation, adolescents are able to articulate their perspectives, language, and aesthetic preferences in ways that traditional top-down approaches often fail to capture. As a result, YPAR-based strategies hold significant promise for producing visual communication that resonates more deeply with adolescent audiences.

A growing body of research indicates that involving adolescents in the design of communication strategies not only improves message quality but also strengthens their sense of ownership and responsibility toward prevention efforts (Smith et al., 2024; Malorni et al., 2022). When adolescents perceive themselves as active contributors, they are more likely to promote prevention messages within their peer networks and broader communities. Participatory processes also create opportunities for adolescents to share their experiences and challenges related to substance use in open and meaningful ways. At the same time, adult facilitators play a critical role in ensuring that youth-generated content remains aligned with prevention objectives and ethical standards in health communication. Consequently, visual messages developed through YPAR tend to be more relevant, engaging, and meaningful than those produced through traditional approaches.

A growing body of research has examined the role of health communication in preventing adolescent substance use, with particular emphasis on message framing, media channels, and audience engagement. Traditional prevention campaigns have largely relied on didactic, text-based, and authority-driven messaging, which has shown limited effectiveness in sustaining adolescents' attention and producing lasting behavioral change. Several systematic reviews in health communication indicate that interventions relying primarily on informational approaches tend to generate short-term knowledge gains but demonstrate weaker and inconsistent effects on attitudes and behaviours (Noar et al., 2016; Wakefield et al., 2022). These findings highlight the need to explore alternative communication modalities that better align with adolescents' cognitive processing styles and media consumption habits.

Visual communication has emerged as a promising domain within health promotion, particularly for younger populations who demonstrate high levels of engagement with image-based and screen-mediated content. Empirical studies in visual cognition and educational psychology suggest that visual representations enhance attention, comprehension, and

memory retention, especially when complex health information is involved (Aiello & Parry, 2020). In substance abuse prevention, visual strategies such as infographics, short-form videos, and narrative-based media have been associated with improved risk awareness and message recall among adolescents. However, existing reviews on visual health communication have tended to focus on general health outcomes or adult populations, offering limited synthesis specific to adolescent substance use contexts.

Parallel to developments in visual communication, research on youth participation has increasingly emphasized the importance of involving adolescents as active contributors rather than passive recipients of health interventions. Participatory models, including Youth Participatory Action Research (YPAR), are grounded in theories of youth agency, empowerment, and critical pedagogy, suggesting that meaningful involvement enhances relevance, ownership, and sustainability of interventions (Leman et al., 2024;Valdez et al., 2020). In substance abuse prevention, youth participation has been linked to improved engagement and stronger alignment between intervention content and adolescents' lived experiences. Nonetheless, the evidence remains fragmented, and participatory approaches are often examined independently from the communication strategies through which prevention messages are delivered.

Despite the parallel growth of research on visual communication and youth participation, these two domains have rarely been integrated within a unified analytical framework. Existing systematic reviews tend to examine visual communication without considering the participatory processes behind message production, or they explore youth participation without analysing the communicative forms through which prevention content is expressed. As a result, the field lacks a consolidated understanding of how visual communication and YPAR may interact to influence adolescent substance abuse prevention outcomes. This fragmentation limits the ability of practitioners and policymakers to design prevention strategies that are both developmentally appropriate and methodologically grounded.

While an increasing number of studies have highlighted the potential of both visual communication and YPAR, systematic integration of these approaches within adolescent substance abuse prevention remains limited. Existing studies often examine visual communication effectiveness and youth participation as separate domains, making it difficult to understand how they interact to strengthen prevention outcomes. Moreover, prior systematic reviews have rarely examined these approaches through a resilience-oriented framework that captures

cognitive, affective, social, and agency-related protective factors. This fragmentation highlights the need for a systematic review that synthesizes evidence on visual communication strategies, evaluates their effectiveness, and clarifies the role of YPAR in enhancing adolescent resilience. Therefore, this study undertakes a systematic literature review to address these gaps and provide a more comprehensive understanding of YPAR-driven visual communication in adolescent substance abuse prevention.

This systematic review aims to examine how visual communication is applied in adolescent substance abuse prevention, to assess its reported effectiveness in shaping knowledge, attitudes, norms, and behaviors, and to explore the contribution of Youth Participatory Action Research (YPAR) in enhancing the relevance and impact of visual prevention campaigns. Accordingly, this review addresses three central questions: (1) how visual communication is implemented in adolescent substance abuse prevention campaigns, (2) whether visual communication influences adolescents' knowledge, attitudes, norms, or behaviors related to substance abuse prevention, and (3) how YPAR contributes to the design and effectiveness of such campaigns.

2. Method

This study employed a Systematic Literature Review (SLR) design, a structured and rigorous approach used to identify, evaluate, and synthesize research findings in a systematic and transparent manner. The SLR design was selected to ensure that evidence related to visual communication and the Youth Participatory Action Research (YPAR) approach in adolescent substance abuse prevention could be examined comprehensively and with minimal risk of selection bias (Kitchenham et al., 2009). This approach aligns with contemporary SLR principles that emphasize reproducibility, transparency in the search and screening process, and the use of standardized quality appraisal frameworks to support evidence-based conclusions.

To define the focus and scope of the review, the PICO framework was applied. The PICO approach facilitated the systematic identification of the target population, the interventions under investigation, the relevant contexts or conditions, and the outcomes to be synthesized. By structuring the review process around these elements, the framework ensured that literature search, selection, and analysis procedures remained closely aligned with the research questions. The application of the PICO framework is summarized in Table 1, which outlines the key components guiding the review. The Comparator component of the PICO framework was treated as contextual rather than mandatory. Given the integrative and descriptive aims of this systematic review, explicit comparative

designs were not required for study inclusion. Instead, when present, comparisons with non-visual or traditional communication approaches were extracted and reported descriptively. This approach aligns with the use of PICO in qualitative and mixed-methods systematic reviews that aim to map intervention characteristics rather than estimate comparative effectiveness.

Table 1. PICO framework

Component	Revised Description
Population (P)	Adolescents aged 10–19 years who are involved in or targeted by substance abuse prevention initiatives.
Intervention (I)	Visual communication strategies used in substance abuse prevention include posters, videos, infographics, comics, photovoice, and other visual media.
Comparator (C)	Other communication approaches reported in the included studies (e.g., non-visual, text-based, or traditional prevention strategies), when applicable. Explicit comparators were not required due to the descriptive and integrative nature of the review.
Outcome (O)	Cognitive, affective, social, and behavioural outcomes related to substance abuse prevention, including knowledge, attitudes, perceived norms, resilience-related protective factors, and youth engagement.

The literature search was conducted using several reputable academic databases to ensure comprehensive global coverage and high-quality evidence. The databases searched included Scopus and Google Scholar, used as a supplementary source to identify additional relevant studies. The search strategy was developed using Boolean operators and keyword combinations derived from the PICO framework to maintain alignment with the research objectives.

The primary search string applied across databases was as follows: *("visual communication" OR "visual design" OR "visual message" OR "health visual") AND ("adolescent" OR "youth") AND ("substance abuse" OR "drug use prevention" OR "substance use prevention") AND ("YPAR" OR "youth participatory action research" OR "youth participation").* All searches were limited to peer-reviewed articles published in English or Bahasa Indonesia within the last ten years to ensure the relevance and currency of the evidence base.

The study selection process followed predefined inclusion and exclusion criteria to ensure methodological rigor and conceptual relevance. Inclusion criteria prioritized empirical studies and review

articles that examined visual communication strategies in the context of adolescent substance abuse prevention, with particular attention to studies incorporating youth participation or YPAR approaches. Articles were excluded if they lacked a substantive visual communication component, were not focused on substance abuse prevention, did not involve adolescent populations, or were conceptually unrelated to the research questions. Study selection was conducted in three sequential stages: title screening, abstract screening, and full-text assessment. This multistage process ensured a systematic and transparent evaluation of eligibility and is summarized in Table 2, which outlines the inclusion and exclusion decisions at each stage.

Table 2. Inclusion and Exclusion Criteria

Category	Inclusion Criteria	Exclusion Criteria
Population	Adolescents aged 10–19 years	Adult populations or children under 10 years of age
Intervention	Visual communication related to substance abuse prevention	Non-visual interventions
Methodology	Empirical studies, participatory studies, YPAR, or mixed-methods research	Opinion papers, editorials, or non-scholarly articles
Focus	Substance abuse prevention	Treatment, rehabilitation, or criminal justice–focused studies
Publication Period	Published between 2015 and 2025 and peer-reviewed	Articles without full-text access or non-peer-reviewed preprints
Language	English or Bahasa Indonesia	Languages other than English or Bahasa Indonesia

The methodological quality of the included studies was assessed using the Mixed Methods Appraisal Tool (MMAT) version 2018, a standardized instrument designed to evaluate qualitative, quantitative, and mixed-methods research within a unified appraisal framework (Hong et al., 2018). MMAT was selected due to its flexibility in accommodating the diverse research designs commonly found in studies of visual communication and Youth Participatory Action Research (YPAR), which

frequently employ qualitative and participatory methodologies. Each study was appraised according to the criteria relevant to its methodological design, and only studies demonstrating moderate to high methodological quality were included in the final synthesis to ensure the robustness of the review findings.

Data from the included studies were extracted using a structured matrix capturing key information, including authorship, year of publication, research objectives, study design, population characteristics, types of visual communication strategies, the role of YPAR, main outcomes, and reported recommendations. Subsequently, the extracted data were analysed using a thematic analysis approach, supported by NVivo 14 software, which facilitated systematic coding, theme development, and cross-study pattern identification. Thematic analysis was selected for its suitability in capturing variations in visual communication strategies and levels of youth participation, while also enabling the identification of recurring thematic structures across diverse prevention contexts.

The entire systematic literature review (SLR) process in this study was conducted collaboratively by three researchers (P1, P2, and P3) to ensure objectivity, traceability, and analytical reliability. All stages of the review adhered to the guidelines proposed by Kitchenham (2009) and followed the PRISMA framework to ensure transparent and standardized reporting. Researcher P1 was responsible for designing and implementing the search strategy and conducting the initial screening of titles and abstracts. Researcher P2 proceeded with full-text assessment, data extraction, and methodological quality appraisal of the included studies using the Mixed Methods Appraisal Tool (MMAT). Researcher P3 verified the quality appraisal results, coordinated the thematic analysis using NVivo 14, and finalized the synthesis of findings. Throughout the review process, regular discussions were held among the three researchers to resolve discrepancies and ensure consistency in data interpretation. All review activities were systematically documented through an audit trail to enhance methodological transparency and research integrity.
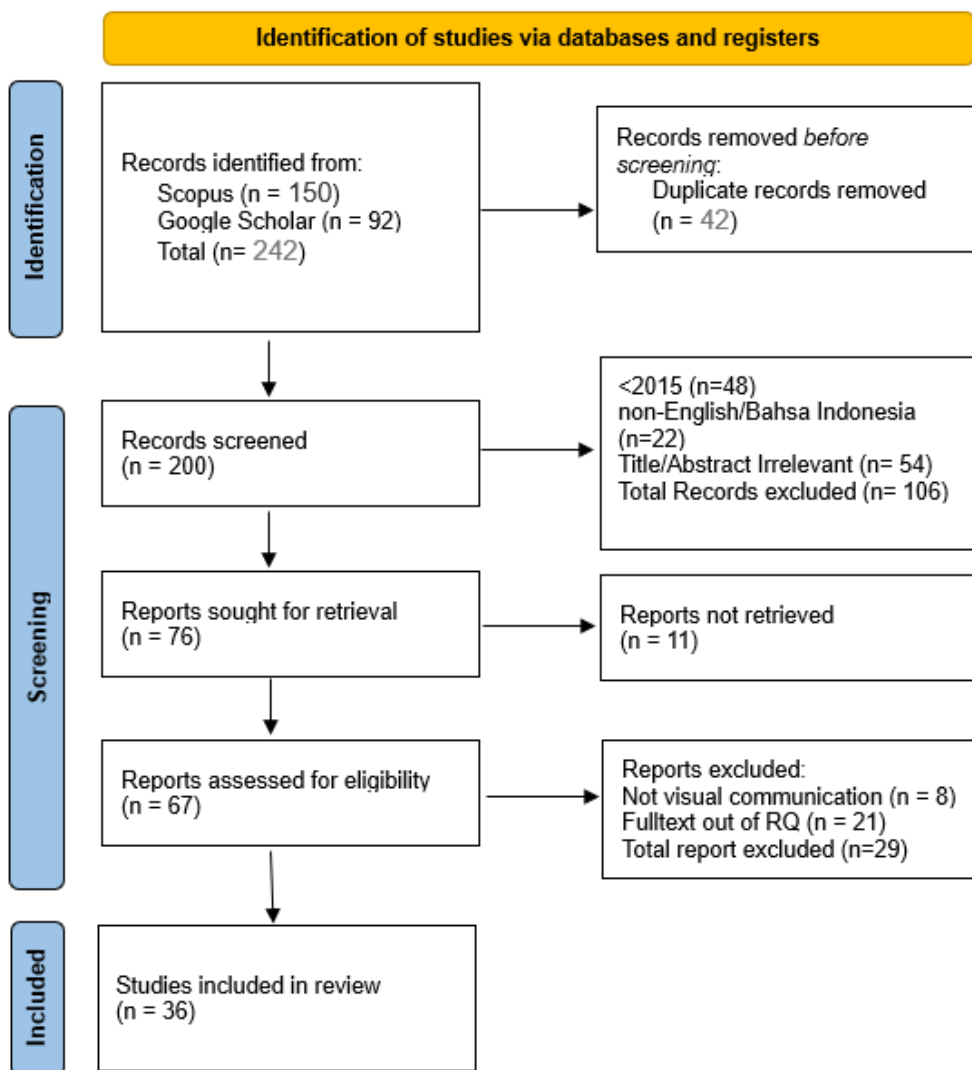
Result

Figure 1. PRISMA diagram

The database search identified a total of 242 records, including 150 records from Scopus and 92 records from Google Scholar. After the removal of 42 duplicate records, 200 unique records were screened based on titles and abstracts. Of these, 106 records were excluded for the following reasons: publication year prior to 2015 (n = 48), non-English or non–Bahasa Indonesia language (n = 22), and articles were excluded at the title/abstract stage if they did not involve adolescents, did not address substance abuse prevention, or did not include a substantive visual communication component (n = 54). Subsequently, 76 full-text reports

were sought for retrieval, of which 11 could not be retrieved. The remaining 67 full-text articles were assessed for eligibility. Following full-text assessment, 29 articles were excluded because they did not focus on visual communication strategies (n = 8) or their full-text content was not aligned with the research questions (n = 21). Ultimately, 36 studies met the inclusion criteria and were included in the final synthesis (Figure 1)

From the initial pool of identified records, 36 studies met the eligibility criteria and were included in the final synthesis. During the title and abstract screening stage, articles were excluded if they did not focus on adolescent populations, did not address substance abuse prevention, or lacked a substantive visual communication component relevant to the research questions. Full-text screening further ensured that included studies provided sufficient empirical or analytical depth for synthesis. This rigorous screening process ensured that the final set of studies was conceptually aligned with the scope and objectives of the review.

The included studies were published between 2015 and 2025 and reflected a range of disciplinary perspectives, including public health, communication studies, education, and youth studies. Geographically, the evidence base was dominated by studies conducted in North America and Europe, with more limited representation from regions such as Asia, Latin America, and Africa. This distribution indicates a concentration of research in Global North contexts, which may influence the thematic focus and intervention approaches reported. As a result, the generalizability of findings to diverse sociocultural and low-resource settings should be interpreted with caution.

Table 3. Data Extraction of Included Studies

No	Author(s) & Year	Country / Region	Study Design	Visual Communication Strategy	Media Format	Youth Involvement Level	Key Outcomes
1	Katas et al. (2024)	Global	Narrative review	Static & digital visuals	TV, print, social media	Passive	Awareness, attitudes
2	Nurdin et al. (2024)	Indonesia	Qualitative	Social media visuals	Instagram posts	Active-Collaborative	Attitudes toward P4GN
3	Habibi & Mahbu	Indonesia	Qualitative (semiotics)	Static visual messaging	Instagram content	Passive	Message interpretation

No	Author(s) & Year	Country / Region	Study Design	Visual Communication Strategy	Media Format	Youth Involvement Level	Key Outcomes
	bah (2024)						
4	Khasanah et al. (2022)	Indonesia	Literature review	Audiovisual education	Educational videos	Passive	Knowledge
5	Ulita et al. (2024)	Indonesia	Quantitative	Static visual messaging	Posters	Active-Collaborative	Persuasion effectiveness
6	Champion et al. (2016)	Global	Systematic review	Digital prevention visuals	Online media	Passive	Prevention effectiveness
7	Barrett et al. (2017)	USA	Mixed methods (YPAR)	Participatory visual media	Youth-produced videos	Active-Collaborative	Agency, prevention skills
8	Shrand et al. (2021)	USA	Mixed methods	Participatory theater	Theater performance	Active-Collaborative	Knowledge, risk perception
9	Triana et al. (2022)	Indonesia	Quasi-experiment	Audiovisual & e-book	Animated video, e-book	Passive	Knowledge
10	Sari (2019)	Indonesia	Qualitative	Audiovisual animation	Motion graphics	Active-Collaborative	Message engagement
11	Jakus (2018)	Europe	Conceptual	Visual PR strategies	Digital visuals	Active-Collaborative	Attention, meaning
12	Elmore et al. (2017)	USA	Quantitative	Media exposure visuals	Commercial media	Passive	Norm perception
13	Ferguson et al. (2025)	Canada	Mixed methods	Youth-centered infographic	Digital infographics	Active-Collaborative	Knowledge, engagement
14	Sukle et al. (2021)	USA	Mixed methods	Counter-marketing visuals	Digital campaigns	Passive	Risk perception

No	Author(s) & Year	Country / Region	Study Design	Visual Communication Strategy	Media Format	Youth Involvement Level	Key Outcomes
15	Peña-Alves et al. (2019)	USA	Content analysis	Youth-generated visuals	Posters, videos	Active-Collaborative	Peer norms
16	Maina et al. (2022)	Canada	Scoping review	Arts-based visuals	Visual arts	Active-Collaborative	Knowledge, attitudes
17	Ballard et al. (2023)	USA	Conceptual	Youth engagement framework	Visual advocacy	Active-Collaborative	Structural resilience
18	Cheetham & Lubman (2017)	Global	Narrative review	Peer-based visuals	Campaign materials	Passive	Norm awareness
19	Austin & Pinkleton (2016)	USA	Narrative review	Media literacy visuals	Educational media	Passive	Critical thinking
20	Russell et al. (2017)	USA / France	Mixed methods	Entertainment visuals	Music videos	Passive	Risk normalization
21	Stanley et al. (2018)	USA	Participatory qualitative	Culturally adapted visuals	Campaign materials	Active-Collaborative	Cultural identity
22	Geusens et al. (2024)	USA	Longitudinal	Social media visuals	User posts	Passive	Risk signaling
23	Shin et al. (2018)	USA	Experimental	Narrative audiovisual	Video storytelling	Active-Collaborative	Refusal self-efficacy
24	Evans et al. (2017)	USA	Mixed methods	Youth-generated social media	Digital content	Active-Collaborative	Intentions

No	Author(s) & Year	Country / Region	Study Design	Visual Communication Strategy	Media Format	Youth Involvement Level	Key Outcomes
25	Cooke et al. (2022)	India	PAR	Participatory video	Community films	Active-Collaborative	Community empowerment
26	Hashemi & Vogel (2024)	USA	Qualitative	Social media messaging	Visual posts	Active-Collaborative	Cognitive dissonance
27	Berey et al. (2017)	USA	Narrative review	Alcohol advertising visuals	Advertisements	Passive	Norm formation
28	Vranken et al. (2023)	Belgium	Qualitative	Influencer visuals	Instagram images	Active-Collaborative	Media literacy
29	Davis et al. (2019)	USA	Longitudinal	Media exposure visuals	Digital media	Active-Collaborative	Norm mediation
30	Vanherle (2025)	Belgium	Qualitative	Private SNS visuals	Closed stories	Passive	Group norms
31	Drake et al. (2024)	USA	Qualitative	Cannabis advertising visuals	Billboards	Passive	Risk awareness
32	Tveleneva et al. (2022)	USA	Quantitative	Campaign visuals	Educational ads	Passive	Risk perception
33	Moreno et al. (2018)	USA	Qualitative	Marijuana promotion visuals	Social media	Active-Collaborative	Policy awareness
34	Liu et al. (2020)	USA	Narrative review	E-cigarette prevention visuals	Digital programs	Passive	Prevention overview
35	Milošević et al. (2024)	Croatia	Experimental	Visual design testing	Illustrations	Passive	Visual attention
36	Jackson et al. (2018)	Global	Narrative review	Media marketing visuals	Commercial media	Active-Collaborative	Risk exposure

The 36 studies included in this systematic review encompassed a wide range of research designs, geographic contexts, and substance use prevention settings. Collectively, the studies reflect the interdisciplinary nature of visual communication research in adolescent substance abuse prevention, integrating perspectives from public health, communication studies, education, and youth development. An overview of the main characteristics of the included studies, including publication year, geographic distribution, research design, intervention setting, substance focus, and level of youth involvement, is presented in Table 4.

Table 4. Characteristic of included studies

Characteristic	Category	Number of Studies
Publication Year	2015–2020	17
	2021–2025	19
Geographic Region	North America	18
	Europe	8
	Asia (including Indonesia)	9
	Global / Multi-country	2
Study Design	Qualitative	12
	Quantitative	9
	Mixed methods	9
	Review / Conceptual	6
Study Setting	School-based	13
	Community-based	9
	Digital / Social media	11
	Multiple settings	3
Substance Focus	Alcohol	14
	Illicit drugs	8
	Tobacco / e-cigarettes	9
	Multiple substances	5
Level of Youth Involvement	Passive audience	17
	Active-Collaborative	19

In relation with RQ3, which explores how Youth Participatory Action Research (YPAR) contributes to the design and effectiveness of visual substance abuse prevention campaigns for adolescents, the findings indicate that YPAR most commonly operates as a facilitated participatory model rather than a fully youth-led process. Although nearly half of the included studies positioned adolescents in active or collaborative roles, youth participation was rarely autonomous and was consistently

embedded within adult-guided structures. This pattern suggests that the contribution of YPAR lies not merely in transferring control to adolescents, but in enabling meaningful collaboration that integrates youth perspectives within professionally guided prevention frameworks. Such facilitation appears particularly important in substance abuse prevention, where ethical considerations, factual accuracy, and regulatory compliance are critical.

As summarized in Table 4, the reviewed studies demonstrate two dominant modes of youth involvement: adolescents positioned as passive audiences (n = 17) and those engaged through active-collaborative roles (n = 19). However, closer examination reveals that even studies categorized as active or participatory relied heavily on adult facilitation by educators, health professionals, or governmental actors. This distribution highlights that participatory engagement in prevention campaigns is often shaped by institutional contexts and governance structures. Rather than representing a limitation, this pattern reflects the practical realities of implementing YPAR within regulated public health domains, where adolescents' participation must be balanced with professional oversight and responsibility.

In the Indonesian context, the involvement of the Badan Narkotika Nasional (BNN) emerges as a particularly salient condition shaping YPAR implementation. The presence of BNN positions the government as a key factor in problem framing, policy alignment, and dissemination of authoritative information related to narcotics prevention. According to (Oktaviani et al., 2023) distinction between endogenous and exogenous Participatory Action Research, this configuration aligns more closely with an exogenous PAR model, in which problems and solution pathways are primarily introduced by external institutions rather than originating entirely from adolescents. Given adolescents' limited access to policy knowledge, legal frameworks, and comprehensive risk information related to substance abuse, such exogenous guidance becomes necessary. Within this hybrid model, YPAR contributes to campaign effectiveness by mediating institutional expertise and youth lived experience, allowing adolescents to co-create visually resonant messages while ensuring that prevention efforts remain credible, ethical, and contextually appropriate.

To address the first research question regarding how visual communication is applied in adolescent substance abuse prevention campaigns, the analysis of the 36 included studies published between 2015 and 2025 identified a variety of visual communication strategies. These strategies differed in terms of media format, degree of interactivity, and level of youth involvement. The classification presented below reflects the dominant visual approaches reported across the reviewed literature and

provides an overview of how visual communication has been operationalized in prevention contexts.

Table 5. Types of visual communication strategies

Type of Visual Communication Strategy	Brief Description	Examples of Media	Number of Studies
Static Visual Messaging	Fixed visual messages emphasizing graphic design elements	Posters, infographics, digital banners, campaign illustrations	14
Audiovisual and Animated Content	Moving-image content with educational or narrative elements	Educational videos, motion graphics, 2D animation	10
Social Media–Based Visual Communication	Visual content disseminated via social media platforms	Instagram posts, influencer imagery, short-form videos	11
Participatory / Youth-Generated Visual Media	Visual media actively produced by adolescents	Photovoice, participatory videos, youth theater	7
Entertainment–Education and Narrative Approaches	Story-based visual formats embedding prevention messages	Narrative videos, dramatized performances, digital storytelling	6
Experimental Visual Design Studies	Studies testing specific visual elements	Eye-tracking studies, color and illustration manipulation	4

Table 5 presents a thematic synthesis of visual communication strategies identified across the included studies. The categories were developed inductively through thematic analysis, based on recurring patterns in media format, narrative structure, and level of youth participation, and informed by established visual health communication literature. The table is intended to support analytical comparison across

strategy types rather than to serve as an exhaustive inventory of interventions.

Static visual messaging emerged as the most commonly used strategy, particularly in school-based and public health campaign contexts. These studies primarily examined how graphic elements such as illustrations, color schemes, typography, and layout influenced adolescents' attention, message comprehension, and risk perception. Audio-visual and animated content represented another dominant category, frequently implemented through educational interventions and digital platforms. These strategies were commonly used to convey substance-related risks in an accessible and engaging manner, often through short videos or animated narratives.

Social media–based visual communication was widely examined in studies published after 2018, reflecting the increasing relevance of digital platforms in adolescents' everyday lives. This category included both prevention-oriented visual content and analyses of adolescents' exposure to pro-substance imagery, highlighting the central role of social media visuals in shaping norms and perceptions. Participatory and youth-generated visual media, while less prevalent, constituted a distinct category characterized by higher levels of youth engagement. These strategies were typically implemented in community-based or culturally adapted interventions, where adolescents contributed directly to message creation through visual storytelling, theater, or digital media production.

Based on the characteristics and classification of visual communication strategies across the 36 included studies, the reviewed literature indicates a growing scholarly focus on visual approaches to adolescent substance abuse prevention between 2015 and 2025. The studies were predominantly empirical and conducted in school-based, community, and digital media contexts, with qualitative, quantitative, and mixed-methods designs relatively evenly represented. Most interventions relied on static visual messaging and audiovisual content, reflecting a continued emphasis on top-down communication approaches. Social media–based visual strategies have become increasingly prominent in more recent studies, paralleling adolescents' intensified engagement with digital platforms. In contrast, participatory and youth-generated visual strategies were less frequently employed, although they represent an emerging shift toward greater youth involvement and agency. Overall, these findings suggest that while visual communication is widely utilized in substance abuse prevention, there remains substantial potential to expand participatory and youth-centered visual approaches.

Outcomes Related to Adolescent Resilience

To address the second and third research questions regarding the effectiveness of visual communication and the contribution of youth participatory approaches, outcomes related to adolescent resilience were examined across the included studies. These outcomes were reported using a range of cognitive, psychosocial, and behavioral indicators. Although resilience was not always explicitly labeled as an outcome, many studies examined protective factors that are conceptually aligned with resilience in the context of substance abuse prevention. These outcomes were typically operationalized through changes in knowledge, attitudes, perceptions, intentions, and forms of youth engagement. The diversity of outcome measures reflects variations in study design, intervention goals, and disciplinary perspectives. Despite this variability, common patterns emerged across the literature. Collectively, the findings indicate that visual communication strategies play a role in shaping multiple dimensions of adolescent resilience.

The most frequently reported outcomes were related to cognitive resilience, particularly improvements in knowledge, awareness, and understanding of substance-related risks. Studies employing static visual messaging, audio-visual content, and digital infographics consistently documented increases in adolescents' factual knowledge following exposure to prevention messages. Several studies also reported heightened risk perception and improved recognition of negative consequences associated with substance use. These outcomes were often measured using pre- and post-intervention assessments or self-reported questionnaires. Cognitive outcomes were typically reported in short-term evaluations conducted immediately after exposure. As a result, cognitive resilience emerged as the most consistently documented outcome across the reviewed studies.

Affective and attitudinal outcomes were also commonly examined in the included literature. Multiple studies reported changes in adolescents' attitudes toward substance use, including reduced positive expectancies and increased negative evaluations of alcohol, tobacco, and other drugs. These shifts were particularly evident in studies utilizing narrative-based visuals and entertainment–education formats. Emotionally engaging imagery and storytelling approaches were frequently associated with stronger affective responses to prevention messages. Some studies noted increased emotional engagement and personal relevance of visual content. Overall, affective and attitudinal changes represented an important intermediate outcome linked to visual communication strategies.

Social and normative dimensions of resilience emerged prominently in studies focusing on peer influence, media norms, and

social media environments. Visual communication strategies that explicitly addressed peer norms were associated with greater awareness of social pressures related to substance use. Several studies highlighted the role of discussion in mediating adolescents' interpretation of visual messages. Exposure to prevention-oriented visuals was linked to increased critical reflection on the perceived normality of substance use. In social media contexts, visual content shaped adolescents' perceptions of peer behaviour and acceptability. These findings suggest that visual strategies can influence resilience by targeting social and normative processes.

A smaller subset of studies reported behavioural or intention-related outcomes, such as reduced intention to use substances, increased refusal self-efficacy, or delayed initiation. These outcomes were less frequently assessed compared to cognitive and attitudinal measures. When reported, behavioural outcomes were often associated with multi-component interventions rather than stand-alone visual messages. Interventions combining visual communication with interactive or participatory elements demonstrated more consistent effects on behavioural intentions. Community-based and school-based programs were common settings for these outcomes. Consequently, behavioural resilience appeared as a more distal and less frequently measured outcome.

Finally, several studies highlighted outcomes related to youth agency and empowerment, particularly within participatory and youth-led visual strategies. These studies reported increased confidence among adolescents in expressing their views on substance use prevention. Youth participation in visual content creation was associated with stronger engagement and ownership of prevention messages. Some studies documented enhanced leadership skills and collaborative capacities among participating youth. Empowerment-related outcomes were primarily observed in YPAR and community-based interventions. Overall, youth agency emerged as a distinct resilience-related outcome linked to participatory visual communication approaches.

4. Discussion

The findings of this systematic review indicate that visual communication in adolescent substance abuse prevention operates through multiple, interrelated pathways rather than as a single or uniform intervention. Across the 36 included studies, diverse visual strategies, mechanisms of influence, and outcome dimensions were identified, reflecting the complexity of how prevention messages are designed, interpreted, and internalized by adolescent audiences. Rather than producing linear effects, these elements interact dynamically with contextual and participatory conditions that shape both the reach and the

impact of prevention efforts. To integrate these relationships and provide a coherent interpretation of the evidence, a conceptual framework was developed to illustrate the major thematic domains and their interconnections. This framework provides the analytical foundation for the discussion that follows.
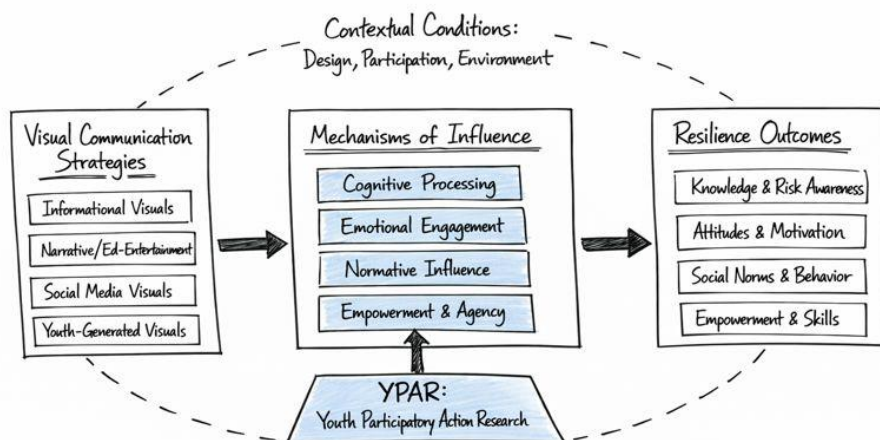

Figure 2. Conceptual Framework of the Reviewed Evidence

As illustrated in Figure 2, visual communication strategies form the primary inputs of prevention interventions and include informational and educational visuals, narrative and entertainment-based content, social media–based messaging, participatory and youth-generated media, and normative or counter-influence visuals. These strategies operate through multiple mechanisms of influence, particularly cognitive processing, emotional engagement, normative regulation, and the development of youth agency. The effectiveness of these mechanisms is conditioned by factors such as design quality, platform environment, institutional support, and the level of youth participation. Together, these interacting components generate resilience-related outcomes across cognitive, affective, social, behavioral, and agency domains, underscoring the conditional and context-dependent nature of visual communication effects.

Across the reviewed literature, visual communication consistently emerged as a central mechanism supporting multiple dimensions of adolescent resilience in substance abuse prevention contexts. The majority of included studies reported improvements in adolescents' knowledge and

risk awareness following exposure to visual prevention messages, particularly when static visuals and audiovisual formats were employed (Traboco et al., 2022; Galmarini et al., 2024; Shin et al., 2018). This pattern was observed across quantitative, qualitative, and mixed-methods designs, suggesting a relatively stable association between visual communication and cognitive protective factors. Similar conclusions were reported in studies using infographics and animated educational media, which demonstrated measurable gains in knowledge and perceived risk among adolescent participants (Ferguson et al., 2025; Triana et al., 2022; Peña-Alves et al., 2019). These findings are consistent with principles of visual cognition and health communication, which emphasize the capacity of visual stimuli to enhance comprehension and retention in adolescent audiences.

However, the strength and scope of reported outcomes varied substantially across studies. While cognitive outcomes were consistently documented, fewer studies demonstrated corresponding behavioural change or long-term resilience-related effects. Several quantitative evaluations reported limited or non-significant effects on actual substance use behaviour, particularly in short-duration interventions or campaigns relying on one-way message exposure (Katas et al., 2024;Elmore et al., 2017). In contrast, studies incorporating participatory and youth-centered components reported broader outcome profiles, including enhanced self-efficacy, refusal confidence, and engagement (Barrett et al., 2017; Shrand et al., 2021). These differences appear to be influenced by variations in study design, outcome measurement strategies, intervention intensity, and the degree of youth involvement in message development.

Taken together, these patterns indicate that visual communication functions primarily as an enabling mechanism within broader prevention systems rather than as a standalone driver of behavioural change. Visual strategies reliably strengthen cognitive dimensions of resilience, while affective, social, and behavioural dimensions appear contingent upon additional contextual and psychosocial supports, including peer interaction, participatory design, and sustained engagement. This interpretation is consistent with the findings of Ballard et al. (2023), which emphasizes that communication effects are mediated by social environments and developmental context. Accordingly, the contribution of visual communication to adolescent resilience should be understood as facilitative and conditional, providing the cognitive and motivational foundation upon which more durable behavioural and psychosocial change may be built.

Narrative-based visual strategies demonstrated consistently stronger affective and attitudinal effects compared to non-narrative

informational formats. Studies employing storytelling, dramatized video, youth theater, and entertainment–education approaches reported heightened emotional engagement, increased perceived relevance, and more pronounced shifts in adolescents' attitudes toward substance use (Shrand et al., 2021; Peña-Alves et al., 2019; Shin et al., 2018; Barrett et al., 2017). In contrast, interventions relying primarily on posters, infographics, and short informational videos tended to generate cognitive gains without comparable emotional or attitudinal change (Katas et al., 2024; Ferguson et al., 2025Click or tap here to enter text.; Ulita et al., 2024). These differences suggest that narrative structure and emotional resonance serve as key mechanisms translating information into personal meaning and motivational impact.

However, narrative effects were not uniform across contexts. Some studies reported modest or inconsistent attitudinal outcomes when narrative exposure was brief, insufficiently contextualized, or unsupported by facilitated discussion. (Katas et al., 2024). Variations in narrative quality, cultural relevance, and delivery context appear to shape adolescents' capacity to identify with message content and internalize prevention messages. These findings align with narrative transportation theory and media psychology, which emphasize that emotional engagement enhances message processing but depends on audience involvement and contextual congruence. Thus, narrative-based visuals strengthen intermediate dimensions of resilience, but their effectiveness remains conditional on implementation quality and social context.

Social media–based visual communication revealed a dual and sometimes contradictory role in adolescent substance use prevention. Several studies documented how exposure to substance-related influencer content and peer-generated imagery normalized risky behaviors and shaped permissive social norms (Vranken et al., 2023); Berey et al., 2017); Geusens et al., 2024). Conversely, prevention-oriented social media visuals combined with discussion and media literacy interventions promoted critical reflection, norm questioning, and resistance to peer pressure (Moreno et al., 2018); Austin & Pinkleton (2016). This divergence highlights how platform affordances, algorithmic exposure, and peer interaction patterns mediate the interpretation and impact of visual content.

Differences across studies appear to stem from variations in platform use, moderation strategies, and degrees of guided reflection embedded in interventions. Where visual exposure was accompanied by structured discussion and normative framing, adolescents demonstrated greater critical awareness of social influences. Without such scaffolding, visual content, whether preventive or promotional, often reinforced

existing norms. These findings underscore that visual communication operates within a broader socio-digital ecosystem in which meaning is co-constructed through peer interaction, technological mediation, and institutional guidance.

Participatory and YPAR-informed visual approaches, although less frequently represented in the literature, exhibited distinctive strengths. Studies employing photovoice, youth-generated media, participatory video, and youth-led theater reported outcomes related to agency, empowerment, ownership, and sustained engagement (Barrett et al. (2017); Shrand et al., 2021); Maina et al., 2022). In contrast, non-participatory, top-down interventions primarily yielded cognitive outcomes with more limited psychosocial impact (Katas et al., 2024; Ferguson et al. (2025). This pattern suggests that youth participation enhances structural and psychosocial dimensions of resilience that are not readily produced through conventional communication models.

Nevertheless, the limited number of explicitly YPAR-based studies indicates that conclusions regarding YPAR effectiveness must remain cautious. Structural barriers, including ethical constraints, institutional control, resource limitations, and power dynamics, continue to restrict the large-scale implementation of youth-led methodologies. The conditional contribution of YPAR thus reflects not conceptual weakness but practical constraints within prevention systems. Where participation was meaningfully supported by adult facilitators and institutional partners, youth-generated visuals achieved greater authenticity, relevance, and sustained impact.

From a practice and interpretation perspective, these findings warrant restrained and context-sensitive recommendations. The strongest and most consistent evidence supports cognitive and attitudinal outcomes, while behavioural change remains less robust and less frequently measured. Accordingly, visual prevention campaigns should not rely solely on information delivery but integrate narrative design, participatory processes, and opportunities for dialogue and reflection. Claims regarding behavioural impact and long-term resilience must remain provisional, given the heterogeneity of study designs and outcome measures.

For policymakers and practitioners, this synthesis suggests that effective prevention requires a layered strategy: combining high-quality visual design, narrative engagement, youth participation, and supportive social contexts. Visual communication should be embedded within broader socio-educational frameworks rather than deployed as an isolated intervention. Future research must prioritize longitudinal designs, explicit resilience frameworks, and expanded YPAR implementation across

diverse cultural and socioeconomic contexts to strengthen the evidentiary foundation for visual-based substance abuse prevention.

5. Conclusion

This systematic review synthesizes evidence from 36 studies to examine the application and reported effects of visual communication strategies in adolescent substance abuse prevention, with particular attention to youth participation and YPAR-informed approaches. Rather than providing definitive conclusions, the findings offer an indicative overview of how visual communication is currently employed and the types of outcomes most frequently reported. Across the reviewed literature, visual strategies were most consistently associated with short-term cognitive outcomes, such as increased knowledge and risk awareness, while evidence related to behavioural change and long-term resilience remains limited and uneven. These patterns reflect broader methodological characteristics of the field, including reliance on self-reported measures and short evaluation horizons.

In terms of contribution, this review does not propose a new conceptual model or establish causal claims regarding effectiveness. Instead, it contributes by mapping the existing evidence base, identifying dominant patterns in visual strategy use, and highlighting the conditions under which certain outcomes have been reported. The synthesis clarifies that resilience is rarely measured explicitly and is instead inferred through proxy indicators such as cognitive, affective, social, and agency-related outcomes. By making this distinction explicit, the review helps delineate the conceptual and methodological gaps that currently constrain more robust claims about resilience strengthening in visual prevention research.

With respect to youth participation, the review indicates that YPAR-driven visual communication remains underrepresented in the literature and is most often implemented in facilitated rather than fully youth-led forms. While participatory approaches appear promising in enhancing engagement and perceived relevance, the limited number of YPAR-focused studies and their contextual specificity preclude strong conclusions about effectiveness. Moreover, structural barriers to youth participation—including ethical considerations, power dynamics, institutional constraints, and resource limitations—are likely to shape both the design and outcomes of participatory prevention efforts. Recognizing these constraints is essential to avoid normative assumptions that youth participation is inherently feasible or effective across all contexts.

The limitations of this review should be interpreted as shaping, rather than merely restricting, the findings. The exclusion of studies published in languages other than English and Bahasa Indonesia likely reduced representation of perspectives from low- and middle-income

regions, where substance use dynamics and prevention infrastructures may differ substantially. Methodological heterogeneity across included studies, limited use of explicit comparators, and the absence of long-term outcome assessments further limit the strength of evidence synthesis. As a result, the findings should be viewed as descriptive and exploratory rather than confirmatory.

Looking forward, future research would benefit from more rigorous and theoretically grounded designs. Longitudinal and comparative studies are needed to assess whether visual communication offers advantages over non-visual approaches and to examine how cognitive and affective outcomes translate into sustained behavioral change. Greater use of explicit resilience frameworks, clearer operationalization of youth participation, and systematic evaluation of participatory processes are also needed. From a policy and practice perspective, visual communication and YPAR-informed approaches should be implemented cautiously, through pilot programs that are context-sensitive and accompanied by robust evaluation. In this sense, the present review should be understood as a foundational step toward more rigorous, participatory, and globally inclusive research on adolescent substance abuse prevention.

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