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Covid-19 Health Education and Promotion Strategies for Children: An Integrative Review

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ABSTRACT

Children during the COVID-19 pandemic are considered a vulnerable age group and a primary focus of health education and promotion. Various platforms and approaches were noted in research and non-research studies; however, their applications to children are uncommon. This study explored the COVID-19 health education and promotion (HEP) strategies designed appropriately for children through an integrative review. A total of sixty-nine (69) articles were identified from PubMed and ScienceDirect are imported to Covidence for screening. Twelve (12) articles were identified that met the criteria for inclusion. Of the 12 articles, five are research articles and seven are non-research articles (theoretical). Six (6) of the articles come from the region of the Americas (AMR), three from the European Region (EUR), and three from the West Pacific Region (WPR). The study shows that social media and website-based information and learning are the most used platforms for disseminating information related to COVID-19, and several approaches to health education and promotion were identified. This integrative review provides valuable insight into the various HEP strategies for Children, which can be redesigned and customized to strengthen the existing COVID-19-related health initiatives and campaigns specifically for children. Moreover, this study can be utilized to develop a direction for future research on epidemic-related health education and promotion for children.

Keywords: Child; COVID-19; Health Education; Health Promotion

INTRODUCTION

As of April 2021, the global COVID-19 pandemic caused by the SARS-COV-2 virus has confirmed more than one hundred forty (140) million cases and three (3) million deaths worldwide (World Health Organization, 2021a). The new variants of SARS-COV-2 are more transmissible than the previously circulating form of the virus (Kirby, 2021) and are linked to partial resistance to the vaccine-induced immunity (Torjesen, 2021). Several studies claimed that COVID-19 cases in children are lower than in adults. According to the global estimates of COVID-19 morbidity and mortality, children account for 0.2% or roughly 3,000 deaths of the total confirmed reported cases (UNICEF, 2021). However, it is proven to be contagious in children of all ages (Dong *et al.*, 2020) and the risk of severe disease manifestations (Kamidani, Rostad, & Anderson, 2021).

The risks brought by the COVID-19 pandemic reversed the remarkable improvements in global child mortality that have been noticed over the past two decades (World Health Organization, 2021b). Many children have mild clinical signs, though certain affected patients have no apparent clinical effects, making it challenging to collect accurate and objective evidence on the incidence of severe COVID-19 (Qi *et al.*, 2021). Therefore, they could be a silent transmitters of the virus, suggesting that the highest susceptibility was in this age group (Gray *et al.*, 2020).

Throughout many aspects, the COVID-19 pandemic has compromised people's health and quality of life, and

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this global outbreak affects every sector of society (Aung *et al.*, 2020), which also includes children. As a critical preventive tactic to avert outbreaks, health promotion, and education is vital to reducing the pandemic's catastrophic effects. According to a study, education and continuous campaign on the importance is a must to increase success rate to end the health crisis . Children must learn about disease infection, health consequences, and the significance of barrier measures among vulnerable people. Parents are responsible for providing the necessary information to their children. Most parents seek information online concerning health or medical issues related to their child, and they mainly use social media regardless of the age category of their children (Bryan *et al.*, 2020).

Also, it is noteworthy that most of the health campaigns that public health experts created are designed primarily for the general population (Gray *et al.*, 2020); this could be a potential issue since children have a different way of learning and understanding concepts compared to an adult. Additionally, children's public health information campaigns are infrequent (Ghia *et al.*, 2020) and one of the limitations of the existing public health strategies is the lack of a theoretical basis (Grech & Grech, 2021). Therefore, to optimize the effectiveness of a particular health information campaign, it is imperative to choose the right educational strategies.

Several studies and pieces of literature propose various approaches for effectively delivering facts, information, and awareness about COVID-19 to children. It is essential not to overlook this age group because everyone is at risk of contracting this lethal virus. Hence, this integrative review aims to examine the existing health education and promotion programs during the COVID-19 pandemic designed explicitly for children to identify the most suitable approach.

METHODOLOGY

Searching Strategy

The scientific literature and research presented in this study were obtained in the online databases of PubMed and ScienceDirect between January 2020 and May 2021. The following combination of keywords and Medical Subject headings (MeSH) were used: COVID-19, Child, and Health Education. In addition, the Boolean operators (AND, OR, and NOT) were utilized. The searched results in PubMed and ScienceDirect were saved and uploaded to Covidence, a primary screening and data extraction tool for standard intervention reviews. Considering secondary data were used in this study, no ethics approval was necessary for this integrative review.

Inclusion Criteria

The articles included in this study must contain the following: 1. health promotion and education platforms; 2. Health education and promotion approach; 3. specifically intended to provide information for Covid-19; 4. Must be designed for children ages 4 to 12 years of age.

Study Selection and Data Extraction

The authors independently performed the preliminary evaluation using Covidence, reviewing the title and abstract and deciding which papers were eligible based on the set criteria. The disparity in the author's vote in screening was compared, and various possibilities were discussed to establish a consensus. Once the authors have determined which papers should be included in the review, they proceed to a full-text review to collect the data necessary for the research study. The data gathered was evaluated separately and compared in order to reach a consensus. Data were extracted from all publications that fulfilled the review's eligibility and inclusion criteria. Article title, type of article, first author, date of publication, country, HEP strategy, and critical outputs were all extracted and analyzed.

Quality Appraisal

To assess the quality of the included scientific literature and research, the authors used type-specific appraisal tools. An MMAT (mixed-method appraisal tool) for reviewing research studies and an AACODS (authority, accuracy, coverage, objectivity, date, significance) checklist for reviewing non-research (theoretical) studies were among them. These checklists provided a structured framework for analyzing various sources of data.

Data Synthesis

The data were synthesized using the constant comparison method, which involves categorizing the concepts based on the commonalities and differences found in the 12 articles. MAXQDA was utilized to aid in the analysis of

multiple data sets. The authors convert the extracted data into systematic categories, facilitating the distinction of patterns, themes, and variations, and all data are compared and analyzed.

RESULTS

Articles Description

A total of sixty-nine (69) articles identified from PubMed and ScienceDirect are imported to Covidence for screening. Ten duplicates were automatically removed, and 21 articles were irrelevant. Thirty-eight articles were full text assessed for eligibility, and twenty-six articles were excluded due to the following reasons: 1.) The HEP platform and approach are not specific for COVID-19; and 2.) They are not designed for children 4 to 12 years of age. The authors identified twelve articles that met the criteria for inclusion. Of the twelve articles, five are research articles, and seven are non-research articles (theoretical). Six of the articles come from the region of the Americas (AMR), three from the European Region (EUR), and three from the West Pacific Region (WPR). It is noteworthy that there are no studies developed in the Eastern Mediterranean Region (EMR), South-East Asia Region (SEAR), or African Region (AFR), respectively, relevant to the study.

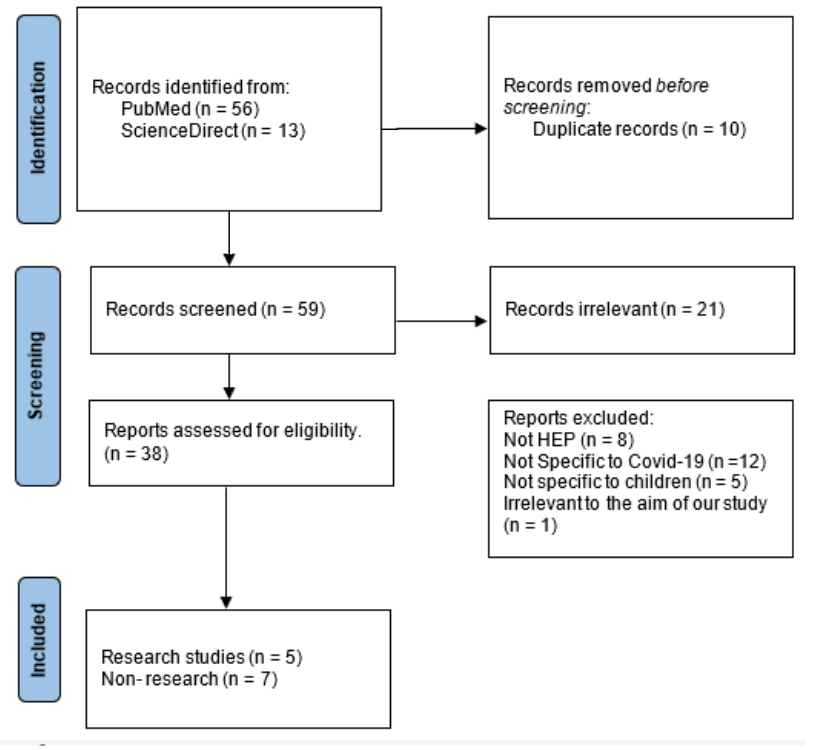

Figure 1: PRISMA Diagram of The Article Selection Process

Health Education and Promotion Platforms

The use of social media was included in two research studies (Bray *et al.*, 2021; Zenone *et al.*, 2021) and three non-research studies (Cheung *et al.*, 2020; Ghia *et al.*, 2020; Klein *et al*., 2020) to promote COVID-19 information to children. Facebook, Youtube, WhatsApp, Instagram, TikTok, and Twitter were among the most common social media platforms. The second common platform identified in various articles was website-based information and learning (Bray *et al*., 2021; Reardon *et al.*, 2020; Zenone *et al*., 2021), mass media such as TV and radio (Bellizzi *et al.*, 2020; Bray *et al*., 2021; Gray *et al.*, 2020), and paper-based print media (Bray *et al.*, 2021; Ghia *et al.*, 2020; Younie *et al.*, 2020) in the form of comics, books, leaflets, brochures, newspapers, and magazines. Telemedicine (Kawabe *et al.*, 2020; Klein *et al.*, 2020; Sivaraman, Virues-Ortega, & Roeyers, 2021) has been proposed as an alternative to face-to-face encounters. Despite the children's various cultural backgrounds, one quasi-experimental

study on training children with an autism spectrum disorder to wear a mask via a telehealth platform confirms the platform's usefulness (Sivaraman, Virues-Ortega, & Roeyers, 2021). In addition, in one experimental (Younie *et al.*, 2020) and one non-research (Bubadué *et al.*, 2020) study, face-to-face HEP workshops such as playful activity and step-by-step action songs were proposed. This platform may not be applicable, particularly in communities with a high COVID-19 incidence, putting children at risk of infection. However, as most children access COVID-19 information through their parents and caregivers, using this platform at home might be advantageous (Bray *et al.*, 2021).

Table 1: Summary of Data Extracted of HEP Strategy on Children

Citation No.	Article Title	Article Type	Country & Region	HEP Platform	HEP Approach
Gray *et al*., (2020)	Health-education to prevent COVID-19 in schoolchildren: a call to action	Non-research (Theoretical)	Australia, WPR	YouTube, Child TV Channels	-Development of an appropriate and engaging hygiene and social distancing education campaign targeting children - cartoon video - based entertainment education approach. - Reinforce and habituate good hygiene practices long-term to prevent rebound infections. - Reinforce desired behavior for children as they learn through direct observation, a critical element in behavior.
Ghia *et al*., (2020)	Informing children citizens efficiently to better engage them in the fight against COVID-19 pandemic	Non-research (Theoretical)	Canada, AMR	Websites, comics, social media, TikTok	- Creating attractive, solid script, and simple-to-read images to allow children acquire new concept and understand complex scientific and medical notion. - Use of engaging platform to raise awareness among children on the mode of transmission of the disease, health risks, the scientific notions of the immune system, the value of barrier measures , and the progress of scientific research.
Bray *et al*., (2021)	"People play it down and tell me it can't kill people, but I know people are dying each day". Children's health literacy relating to a	Research	USA, AMR	Information from parents/caregiver, TV, leaflets, internet news, WhatsApp,NHS websites, health charities, G1HPE	- Diluting, filtering, and adapting the Information shared with children. - Recognizing individuals, families, community/school, and society as an important aspect of health literacy.

	global pandemic (COVID-19); an international cross sectional study			TV channels, radio, social media, newspapers and magazines	- Considering child's platform preference to receive information
Zenone *et al*., (2021)	Supporting youth 12–24 during the COVID-19 pandemic: how Foundry is mobilizing to provide information, resources and hope across the province of British Columbia	Research	Canada, AMR	Website like Foundrybc.ca , and Social Media such as Facebook, Instagram, and Twitter.	- Amplification and translation of crucial government messages. - Development of content that is age appropriate and accessible format. -Development of hosting opportunities, through social media and website articles, to engage young people and caregivers, creating a sense of community by promoting togetherness and social connection during the COVID-19 pandemic. - Establishment of a structured and supportive environment for the young and family/caregiver advisors to allow content suggestions, ideas and development. - Forge partnership with key organization such as Ministry of Health, Provincial Health and CDC.
Klein *et al*., (2020)	Promoting and supporting children's health and healthcare during COVID-19 – International Paediatric Association Position Statement	Non-research (Theoretica1)	USA, AMR	Telemedicine, email, social media application	- Avoiding rumors and sham treatment. - Use of telemedicine as an alternatives to face-to-face encounters to deliver evidenced-based information sharing about Covid-19. -Provision of appropriate evidence-based information from reliable sources like the International Pediatric Association, Regional and National pediatric society. -Disseminate updates and provide or link to resources to help societies and their members identify and use reliable

					information, and to help families of the children we care for get the care they need.
Cheung *et al*., (2020)	Health support to pediatric cancer survivors and their families during the COVID-19 pandemic	Non-research (Theoretical)	Hong Kong, WPR	WhatsApp, WeChat	- Sending of information via mobile about general hygiene measures, including proper hand hygiene, proper mask usage, the use of bleach to maintain a hygienic environment at home, the observation of good food hygiene, and the adoption of a healthy lifestyle. -Coordinated effort with health professionals to promote physical and psychological wellbeing of vulnerable population.
Reardon *et al*., (2020)	Medical Student Development of K-12 Educational Resources During the COVID-19 Pandemic	Non-research (Theoretical)	USA, AMR	Web based Online Learning System	-Free online educational modules about COVID-19 for elementary, middle, high school, and college students. -Educational modules are translated in different languages such as English, Espanol, Francais, Japanese. -Creation of COVID-19 classroom an engaging and informative resources that provide accurate and developmentally appropriate educational materials for all student including elementary and middle school.
Bellizzi *et al*., (2020)	COVID-19 and children. From Luis Sepulveda to Madam Mim	Non-research (Theoretical)	Switzerland, EUR	Illustration; story	-Assimilation of viral infection with comic characters. -Stimulate child's interest and creativity. -All-family and all society approach when dealing with information and measures related to current pandemic.
Younie *et al*., (2020)	Improving young children's handwashing behaviour and	Research	United Kingdom, EUR	Book, song, online games, glo-gel activity	-Intervention focused on the quality of the handwashing and included both practical and conceptual aspects applying

	understanding of germs: The impact of A Germ's Journey educational resources in schools and public spaces				different activities. (1) Book: Illustrated children's book using thermochromic ink. (2) Song: A step-by-step action song. (3) Website: Interactive online games. (4) Glo-gel: Experiential small group activity. - Repeating of activities to increase opportunity of learning.
Kawabe *et al*., (2020)	Making brochure of Coronavirus disease (COVID-19) for children with autism spectrum disorder and their family members.	Non-research (Theoretical)	Japan, WPR	Online Brochure	-Creation of Covid-19 brochure specific for Children with ASD, content includes: ASD in relation to Covid-19, How to prevent Corona virus disease, tips on helping children with ASD to stay at home. - Used of drawings to explain about Covid-19
Sivaraman *et al*., (2021)	Telehealth mask wearing training for children with autism during the COVID-19 pandemic	Research	Belgium, EUR	Telehealth - video calling platform	-Graduated exposure and shaping to establish mask-wearing in children with ASD. -Interacting with children on their comfortable language.
Bubadué *et al*., (2020)	Health education workshops with children in the context of COVID-19 pandemic	Research	Brazil, AMR	Face to face workshop,	-Integrating Covid-19 health promotion and education to schools. - Playful teaching activities to offers a space for the build of knowledge with children, having the entertainment as a methodological and strategic resource for communication with this population. -Playful activities helps the child to materialize his actions for the abstraction of thought, capable of reproducing actions. - Use language and information according to child's development.

Health Promotion and Education Approach

A Content Development

A total of six articles, two research articles, and four non-research articles in combination suggested that the content of health education and promotion resource materials on COVID-19 for children must be accessible,

appealing, legible, and simple to understand (Bray *et al.*, 2021). Contents should be age-appropriate (Zenone *et al*., 2021) and translated into other languages (Kawabe *et al*., 2020; Reardon *et al.*, 2020). Additionally, the importance of visual support as a tool is highlighted, such as drawings and illustrations (Kawabe *et al*., 2020), the use of cartoon video-based health education material (Gray *et al.*, 2020), and stories infused in order to convey the desired message (Bellizzi *et al*., 2020), which is a critical feature in content development relative to COVID-19 prevention for children.

B Information Delivery

It was revealed in two research and three non-research articles that the delivery of information must be precise and reliable (Ghia *et al.*, 2020) and should promote interaction among children (Sivaraman, Virues-Ortega, & Roeyers, 2021). Children prefer to learn interactively (through animation, television shows, games, and quizzes) (Bray *et al*., 2021). On the other hand, parents play a vital role in diluting and filtering the information shared with their children (Bray *et al.*, 2021) to provide an accurate explanation to minimize anxiety among children (Gray *et al*., 2020). Furthermore, an all-family and all-society approach is recommended when dealing with information on COVID-19 prevention (Bellizzi *et al.*, 2020).

C Behavior Modification

Five research studies explored the approach to behavioral modification in children to prevent COVID-19 transmission. Parents and caregivers play a critical role in a child's learning, especially in supervising children in various infection prevention practices (Bray *et al.*, 2021). For instance, one study shows improved hand-washing techniques by integrating newly acquired information and knowledge into children's activities using modeling (Younie *et al.*, 2020). Playful activities such as step-by-step action songs on hand-washing, interactive online games, and glo-gel activities are a few examples that help the child materialize their actions for abstract thought, capable of reproducing acts (Bubadué *et al.*, 2020; Younie *et al.*, 2020). Similarly, Entertainment-education methods such as videos and cartoons, which stimulate children's interests, have proven to reinforce COVID-19 protective behaviors in children as they learn through direct observation, a critical element of behavior (Gray *et al.*, 2020). It is noteworthy that creating a structured and supportive environment can create opportunities for children to practice the desired behaviors (Zenone *et al.*, 2021). In addition, gradual exposure, shaping (Sivaraman, Virues-Ortega, & Roeyers, 2021), and repetition of activity would likely increase learning probability and enable children to modify protective behavior (Younie *et al.*, 2020).

D Information Support Networks

The importance of support networks for children in accessing accurate and reliable information was endorsed in two research studies (Bray *et al.*, 2021; Zenone *et al.*, 2021) and four non-research studies (Cheung *et al*., 2020; Ghia et al., 2020; Klein *et al.,* 2020; Reardon *et al.,* 2020). One study showed that parents and caregivers are the primary sources of information as self-reported by children aged 7–12 from the UK, Australia, Canada, Brazil, and Spain. In addition, children's knowledge of COVID-19 is influenced by various sources, including individuals, families, communities/schools, and society (Bray *et al.*, 2021). It is crucial to identify key organizations (Ghia *et al.*, 2020) that support health promotion campaigns through evidence-based information delivered in a friendly, developmentally appropriate, and accessible format (Zenone *et al*., 2021). Likewise, a group of medical students at Harvard Medical School created a website with free online educational modules on COVID-19 applicable to various ages, including elementary and middle school, that have positively impacted the world (Reardon *et al*., 2020). Coordinated efforts are required to continuously provide appropriate and evidence-based resources (Cheung *et al.*, 2020). Therefore, children must be provided with links, such as websites and online applications, to help them navigate trustworthy resources beneficial to filling knowledge gaps (Klein *et al.*, 2020).

DISCUSSION

This study analyzed the different existing health education and promotion strategies during the COVID-19 pandemic that were explicitly designed and suitable for children. Social media is the most widely used platform to disseminate information on COVID-19 in Children. Among other platforms, it is considered the fastest for sharing information and updates that allow for the integration of multiple media formats to engage audiences by including hyperlinks in social media messages. Further research confirms that most children today have high access to the

internet and Wi-Fi, enabling them to utilize social networking sites to find information and assist in learning (Badri *et al.*, 2017). In addition, using social media as a health-related learning platform to bridge knowledge disparities is a valuable learning resource (Goodyear & Armour, 2021). However, though this platform is widely used with many supporters and potential advantages, it lacks conclusive evidence that it improves health outcomes in children (Hamm *et al*., 2014).

A significant consideration in content development related to COVID-19 prevention for children is interactive, cartoon/animation, and video-based health education material associated with stories to communicate the intended message. Content should be age-appropriate, translated into different languages, available, appealing, and simple to grasp. Education-entertainment is a practical solution for children to improve social and emotional learning capabilities (Hubley *et al.*, 2020), especially during a pandemic. Interactive learning resources significantly influence their learning abilities and adaptability (Islam *et al*., 2014), consistent with another study where computer animation enables children to visualize content or ideas difficult to visualize in the actual world and explain difficult-to-understand concepts (Rohana Mansor *et al.*, 2020). Additionally, illustrations can depict abstract concepts and generally unseen things and phenomena through visible metaphors. However, it requires a strong narrative and an appealing, easy-to-read illustration of complex messages in a non-threatening and accessible way to ensure the message is delivered effectively (Ghia *et al*., 2020).

Information delivery can be challenging for parents and caregivers as it may impact children's mental health, and providing assistance is essential for easing children's anxiety. This study supports the concept that an effective HPE strategy should involve parents as partners in delivering COVID-19 information to children. Supplementarily, conveying the key message on COVID-19 prevention through shows, games, and quizzes and using animation and television is recommended because children prefer interactive learning. Mainly, children rely on their parents or guardians for guidance on how to respond during a crisis (Phelps & Sperry, 2020). With the guidance of clear, accessible, guilt-free, and trustworthy sources of information, children can better comprehend their position in a continuously changing environment (Ghia *et al.*, 2020), which can help them develop resilience and motivate them to actively participate in the COVID-19 pandemic battle (Stark *et al.*, 2020).

Behavior modification requires a collective strategy of structured activities designed for children, starting with generating a conducive learning environment where they can directly observe and are allowed to participate in and perform hygiene practices that will protect them from COVID-19. Stimulating their interest through playful activities and technology like interactive online games will enable them to produce protective behaviors against COVID-19 (Goldschmidt, 2020). For children, changes in their usual daily routine caused by the COVID-19 pandemic and its complex disease information could pose general mood and behavioral issues as they could perceive it differently (Carroll *et al.*, 2020; Singh *et al.*, 2020). Early and deliberate planning is critical in behavior modification, for this will influence the child's ability to develop resilience to drastic changes brought about by the pandemic (Stark *et al.*, 2020).

Developing a support network requires extensive key stakeholders' collaboration (Varda & Talmi, 2018) to continuously provide appropriate and evidence-based information (Cheung *et al.*, 2020). The exponential proliferation of health information daily presents a concern in assessing the quality of information. Parents and caregivers, as primary sources of information, must identify accurate and reliable sources to avoid false and misleading health information since most children rely on them for details about COVID-19 (Bray *et al.*, 2021). However, the sustainability of information support networks and securing and maintaining engagement by all key stakeholders could be challenging.

The lack of theoretical basis for existing public health strategies (Grech & Grech, 2021) can be addressed through the HEP strategies identified, and at the same time, the usual health campaigns designed for the general population (Gray *et al.*, 2020) can now be redesigned and customized for children. Furthermore, since various health programs and services on COVID-19 have no strong emphasis on the child's health (A. Singh & Vellakkal, 2021), health educators and practitioners can use these strategies to strengthen existing epidemic-related health initiatives and campaigns specifically for children.

Limitation

Although this integrative review gave us valuable insight into the various HEP strategies for Children in the

COVID-19 pandemic, several limitations should not be overlooked in this work. For instance, some relevant studies were not considered because they had been published in languages other than English (e.g., Chinese and Spanish). Another thing to consider is that the literature in this systematic review is limited to PubMed and ScienceDirect; other databases such as CINAHL and PsychINFO could have expanded and produced a different result. Third, even though the authors have adopted a comprehensive search strategy and meticulously screened and reviewed the articles in the literature selection, there is a possibility that some other articles on this theme skipped the author's attention and analysis. Lastly, the studies identified for this integrative review originated from the regions of the Americas (AMR), European Region (EUR), and West Pacific Region (WPR).

CONCLUSION

This integrative review highlights the vital role of individuals, families, communities, schools, and society in influencing children's knowledge and health behaviors. Overall, this study suggests a positive recommendation for using social media and website-based information and learning platforms combined with the identified HEP approaches: (a) Content development, (b) Information delivery, (c) Behavior modification, and (d) Information support networks in providing critical information on the disease and promoting health and positive behavior for children in the COVID-19 pandemic. Future studies may explore various HEP strategies to validate their implications. The findings of this study can be utilized to develop a direction for future research on epidemic-related health education and promotion for children.

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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