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Childhood Obesity: A Systematic Review on Prevention Strategies Discourse Among Parents on Social Networking Sites

NURZIHAN HASSIM*
Universiti Kebangsaan Malaysia

SYARIFAH NURLEYANA WAFA
Multimedia University Malaysia

RABIAH ADAWIAH ABU SEMAN
IMU University Malaysia

ABSTRACT

Childhood obesity has become a major public health concern on a global scale. The World Health Organization reported that 39 million children under the age of five are overweight or obese, and this number will reach 70 million in 2025 if current trends continue. Given the prominence of this issue, parents require a stronger grasp of the effective prevention strategies. At present, social networking sites (SNS) have become the preferred sources of information for many parents. This systematic review examines how parents, as main decision-makers of their household nutrition intake, obtain and share prevention information on SNS. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement was adopted in reviewing articles sourced from Scopus and Web of Science journal databases. A total of 272 studies were initially identified discussing the subject of childhood obesity prevention strategies from the perspective of parents but only 38 met the inclusion criteria and therefore were analysed for this study. The findings explained the exchange of information, experiences, and support among parents and caregivers regarding childhood obesity prevention with the access to SNS. This includes understanding the importance of applying healthy eating habits, increasing physical activity, limiting screen time, and fostering a supportive home environment. This review also informs the specific areas and content of research that should be focused for future studies.

Keywords: *Childhood obesity, prevention strategies, social media, social networking sites, parental discussions.*

INTRODUCTION

Childhood obesity has emerged as a pressing global public health challenge, with its prevalence escalating across both developed and developing nations. According to the World Health Organization (2020), 39 million children under the age of five are overweight or obese, and this number will reach 70 million in 2025 if current trends continue. At present, childhood obesity is known to increase the risk of developing several health problems, including type 2 diabetes, cardiovascular disease, and certain cancers. It also has significant social and psychological consequences, such as lower self-esteem and increased risk of depression (Singh, Mulder & Twisk, 2012). Prevention of childhood obesity involves a comprehensive approach that would necessitate individual, family, and community-level interventions. Managing childhood obesity typically requires various lifestyle changes, including dietary modifications and increased physical activity levels, along with behavioural interventions such

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as family-based therapy and support groups (Skelton et al., 2012).

Following COVID-19, numerous studies examined information exchange on social networking sites (SNS) related to behavioural change during health crises, including public awareness and prevention strategies (Hauer & Sood, 2020; Petkovic et al., 2021; Feng & Tong, 2022; Seiler et al., 2022). These studies considered perspectives from both content providers and SNS users. Despite SNS-based interventions' effectiveness in obesity prevention through health promotion, identifying those specifically targeting children and adolescents has proven challenging through traditional literature reviews (Zhou et al., 2024, Vega-Ramírez et al., 2020; Shaw, 2023). Boyd and Ellison (2007) defined SNS as web-based platforms enabling users to share public or private connections, including Facebook, Twitter, Instagram, and chat applications. SNS serve as beneficial tools for disseminating evidence-based information about childhood obesity, enhancing public health literacy, and encouraging positive behavioural change among parents as caregivers (Huang et al. 2022; Reid et al., 2016). However, it remains unclear how prevention strategies were most effectively articulated and sustained for parents based on new media discourse (Nguyen et al. 2019). Consequently, more systematic reviews aggregating findings from these studies are needed.

This review is guided by the central research question: *What strategies for childhood obesity prevention are discussed on social networking sites (SNS),* and how effective are these strategies in promoting behavioural change among parents and families? This study addresses the identified gap by systematically reviewing and critically evaluating existing research to deepen understanding of both the content and effectiveness of childhood obesity prevention strategies communicated through SNS. Specifically, it aims to identify and examine the diverse patterns through which parents obtain and share obesity-related content on these platforms, while assessing the measurable impacts of these strategies on health behaviours and outcomes.

METHODOLOGY

This study incorporates the PRISMA Statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach, as outlined by Liberati et al. (2009). The following section will provide a detailed discussion of this approach. The subsequent section will describe the review process, which involved a comprehensive analysis of academic articles and papers to identify, select, and assess research related to the information-seeking and processing behaviours of parents and caregivers in the context of preventing childhood obesity. Lastly, an analysis of the findings will be presented, along with a concluding summary that suggests potential avenues for future research in this area. The research question for this study was developed using the PICo tool, which helps authors create appropriate questions for their review. PICo is based on three key elements: Population or Problem, Interest, and Context. Considering these elements, the authors incorporated three main aspects into their review: *childhood obesity* (Problem), *prevention strategies* (Interest), and *social networking sites* (Context).

Search Strategy and Database Selection

A systematic search strategy was implemented across three major academic databases: PubMed, Scopus, and Web of Science. This database selection provides comprehensive coverage across multiple disciplines relevant to childhood obesity prevention research, including medical sciences, social sciences, and public health literature. PubMed ensures

coverage of medical and health sciences literature, Scopus offers extensive coverage of peer-reviewed literature across diverse academic fields, while Web of Science provides access to high-impact research with strong citation indexing capabilities.

Keywords were identified through multiple approaches including consultation with existing literature, examination of key papers in the field, and use of online thesaurus resources (thesaurus.com). The search strategy incorporated synonyms and related terms to ensure comprehensive retrieval of relevant studies as well terms suggested by Scopus. The researchers used a combination of keywords and applied various search techniques, including field code functions, phrase searching, wildcards and truncation. The core search approach subsequently combined three concept groups using Boolean operators: (1) childhood obesity and related terms, (2) prevention and intervention strategies, and (3) social networking sites and digital media platforms.

Based on these groups, keywords from the main concepts above were derived, such as *overweight children, overeating, child nutrition, child wellness, child obesity, overweight child, intervention, awareness, motivation, behaviour change, prevention strategy behavioural change, social media, social network, social networking sites, online community, social networking site, social networks* and *online communities* were also used in the process.

Table 1: Search strategy by database

Database	Search String
PubMed	(("child* obesity"[Title/Abstract] OR "overweight child*"[Title/Abstract] OR "overeating"[Title/Abstract] OR "child nutrition"[Title/Abstract] OR "child wellness"[Title/Abstract]) AND ("prevention"[Title/Abstract] OR "intervention"[Title/Abstract] OR "awareness"[Title/Abstract] OR "motivation"[Title/Abstract] OR "behaviour* change"[Title/Abstract]) AND ("social networking site*"[Title/Abstract] OR "social media"[Title/Abstract] OR "social network*"[Title/Abstract] OR "online communit*"[Title/Abstract] OR "new media"[Title/Abstract] OR "online media"[Title/Abstract])) AND (English[Language]) AND (2017:2022[Publication Date])
Scopus	TITLE-ABS-KEY (("child* obesity" OR "overweight child*" OR "overeating" OR "child nutrition" OR "child wellness") AND ("prevention" OR "intervention" OR "awareness" OR "motivation" OR "behaviour* change") AND ("social networking site*" OR "social media" OR "social network*" OR "online communit*" OR "new media" OR "online media")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017)) AND (LIMIT-TO (LANGUAGE , "English"))
Web of Science	TS=("child* obesity" OR "overweight child*" OR "overeating" OR "child nutrition" OR "child wellness") AND TS=("prevention" OR "intervention" OR "awareness" OR "motivation" OR "behaviour* change") AND TS=("social networking site*" OR "social media" OR "social network*" OR "online communit*" OR "new media" OR "online media")

The timeframe was limited to articles published between 2015 and 2025, reflecting the concept of "research field maturity" as outlined by Kraus et al. (2020), where this period captures the significant evolution of social media platforms and their application in health interventions, particularly following increased digital health adoption during the COVID-19 pandemic. Additionally, this time frame was selected due to the insufficient number of highly cited published studies to conduct a representative review.

Eligibility and Exclusion Criteria

The authors manually monitored the retrieved articles to ensure all the remaining articles after the screening process are in line with the inclusion and exclusion criteria. The authors first developed a systematic protocol for data processing before determining the main dataset. They then established specific criteria for what would and would not be included. The first major requirement was that only journal articles containing original research data would be accepted. The authors excluded several types of sources, including systematic reviews, meta-analyses, opinion pieces and editorials.

The systematic review employed clearly defined inclusion and exclusion criteria to ensure methodological rigor and relevance to the research objectives. The authors focused on empirical research papers containing primary data and were written in English language, to avoid any semantic confusion. Given that the objective of the systematic literature review (SLR) was related to engagement on social networking sites and healthcare, articles from both the sciences and social sciences were included to increase the likelihood of obtaining more articles pertaining to childhood obesity prevention strategies.

The eligibility was further determined based on the literature review and topic, henceforth the articles were screened to be narrowed down to articles on childhood obesity and its representation on social media networks. This process was done by reading the title and abstract of the articles. The screening also looked into the sampling; where respondents and informants of the study would concentrate on stakeholders such as parents as caregivers of children up until the age of 18 years old in order to understand their perception and acceptance of childhood obesity and its risks. Furthermore, the regulations specifically exclude publications not in English to mitigate ambiguity and the risk of semantic loss throughout the translation process.

Table 2: Inclusion and exclusion criteria

Criterion	**Inclusion**	**Exclusion**
Study Design	Experimental studies, observational studies, mixed-methods research	Systematic reviews, meta-analyses, opinion pieces, editorials
Population	Parents, caregivers, families with children aged 0-18 years	Studies focusing solely on healthcare providers or adult obesity
Intervention/Exposure	Childhood obesity prevention strategies via social media/online platforms	Treatment-focused interventions, non-digital interventions
Outcomes	Behaviouralchanges, knowledge acquisition, engagement metrics, health outcomes	Studies without measurable outcomes
Language	English language publications	Non-English publications
Timeline	2015-2024	Publications before 2015
Data Type	Primary empirical data	Secondary analyses, theoretical papers

The study selection process involved two independent reviewers (primary and secondary) who screened titles and abstracts against inclusion criteria. Disagreements were resolved through discussion, with a third reviewer consulted when consensus could not be reached. Full-text articles were then independently assessed by both reviewers, with inter-rater reliability calculated using Cohen's kappa coefficient (κ = 0.84, indicating excellent agreement).

Quality Assessment

Study quality was assessed using appropriate tools based on study design, the Mixed Methods Appraisal Tool (MMAT) for mixed-methods research. Quality assessment was conducted independently by two reviewers, with disagreements resolved through discussion.

Data Extraction and Analysis

Data extraction was performed using a standardized form developed specifically for this review, capturing study characteristics, participant demographics, intervention details, outcome measures, and key findings. Extracted data included study setting, sample size, participant characteristics, social media platforms used, intervention components, duration of follow-up, outcome measures, and reported effectiveness. Thematic analysis was conducted following Braun and Clarke's six-phase approach, involving familiarization with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report. Two reviewers independently coded the extracted data, with themes emerging through iterative discussion and refinement.

RESULTS

The systematic search yielded 272 potentially relevant studies across the selected databases. After removing duplicates (n=32), 240 studies underwent title and abstract screening. Following the systematic screening process, 38 studies met the inclusion criteria and were included in the final analysis. The PRISMA flow diagram details the selection process with clear numbers at each stage.

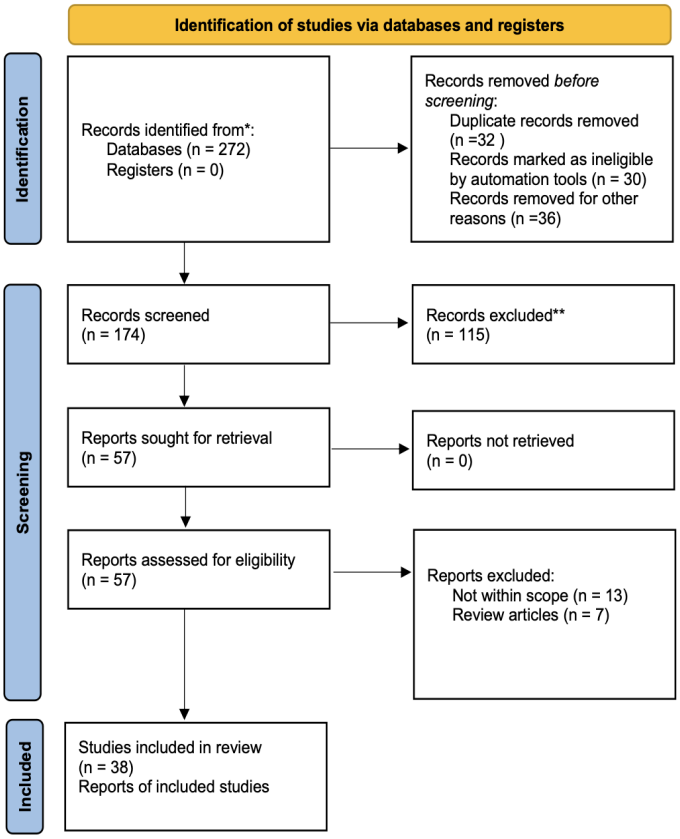


Figure 1: Flow diagram of inclusion and exclusion criteria

The systematic review analysed 38 documents to address the primary research questions. The findings were organized into two main sections. The first section presents the baseline information extracted from the articles, including the articles' origins, the distribution of in terms of research design and components of theories applied. This section provides an overview of the said characteristics and trends in the selected literature.

The second section focuses on thematic analysis to systematically examine the content of the selected articles. By identifying common themes and patterns across the literature, the review aims to synthesize the key factors and theoretical frameworks that shape parents perceptions towards childhood obesity decision-making processes in the context of social networking sites.

Research Design

The systematic review revealed diverse methodological approaches, emphasizing social networking platforms as intervention tools. Quantitative studies (32%) evaluated social network dynamics in childhood obesity contexts, with Ahmad et al.'s (2020) randomized controlled trial examining family-based interventions enhanced through social media engagement. Sampasa-Kanyinga et al. (2020) directly explored relationships between social media use patterns and BMI outcomes among adolescents, while Polman et al.'s (2023) four-arm study identified influence agents within parents' social networks that promote healthy behaviours.

Qualitative studies (26%) provided rich insights into how social media shapes

discourse on childhood obesity. Wu et al.'s (2021) interviews and focus groups revealed how parents navigate digital information environments when forming perceptions about childhood obesity, often encountering conflicting messages across platforms. Holmberg et al.'s (2019) semi-structured interviews demonstrated how parents and adolescents critically evaluate online health information across websites and social networks.

Mixed methods studies predominated (42%), emphasizing both engagement metrics and experiential dimensions. Criss et al.'s (2019) case study of health marketing strategies showed how social media campaigns could effectively disseminate obesity prevention messages while gathering qualitative data on message reception. Henström et al.'s (2022) analysis of online engagement metrics revealed interaction patterns and content preferences, while their qualitative components illuminated parents' meaning-making processes when encountering obesity-related content online.

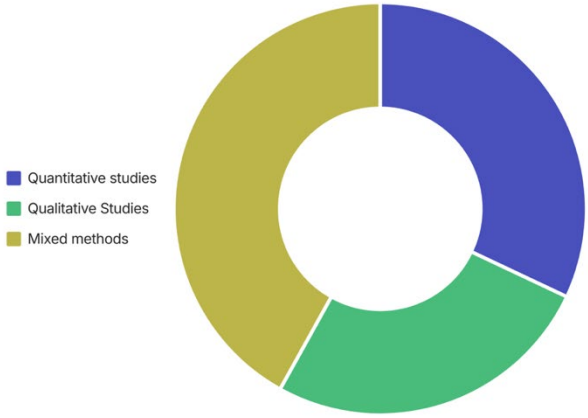


Figure 2: Distribution of research design among studies analysed

Geographic Distribution and Intervention Effectiveness

The systematic review reveals distinct geographic patterns in digital and social media interventions for childhood obesity prevention. North American research, particularly from the United States, demonstrated sophisticated integration of social media platforms. Massachusetts studies (Criss et al., 2019) showed how strategic Facebook campaigns could reframe obesity discourse toward prevention-oriented messaging. Duh-Leong and Braganza (2020) highlighted how digital peer networks shaped dietary choices through online information sharing. American research also examined how digital environments intersect with family systems, as shown in Jang, Brown, and Vang's (2021) investigation of online food marketing's effects on parental stress and home food environments.

European research featured innovative approaches to social media integration for obesity prevention. Scandinavian countries led in creating comprehensive digital ecosystems, as seen in Norway's Food4toddlers study (Roed et al., 2019), which created immersive online environments reframing childhood nutrition through interactive content and virtual community building. Portuguese researchers advanced this approach through the Nutriscience Project (Azevedo et al., 2019), which revolutionized nutrition literacy through gamification.

Asia-Pacific research demonstrated distinctive approaches. Malaysian studies by Qian and Hassim (2022) analyzed how mainstream and social media construct obesity discourse, revealing disparities between English and Malay language digital media framing. Chinese research by Wu et al. (2021) explored how parents navigate complex digital information landscapes when forming perceptions about weight management, highlighting tensions between traditional views favoring child plumpness and online messaging promoting leaner ideals.

Lower and middle-income countries adapted digital tools despite infrastructure limitations. Bangladesh demonstrated how information diffusion through basic digital channels could effectively reach mothers with nutritional messaging (Alam et al., 2021), showing how simplified digital interventions could reshape nutritional discourse when culturally contextualized.

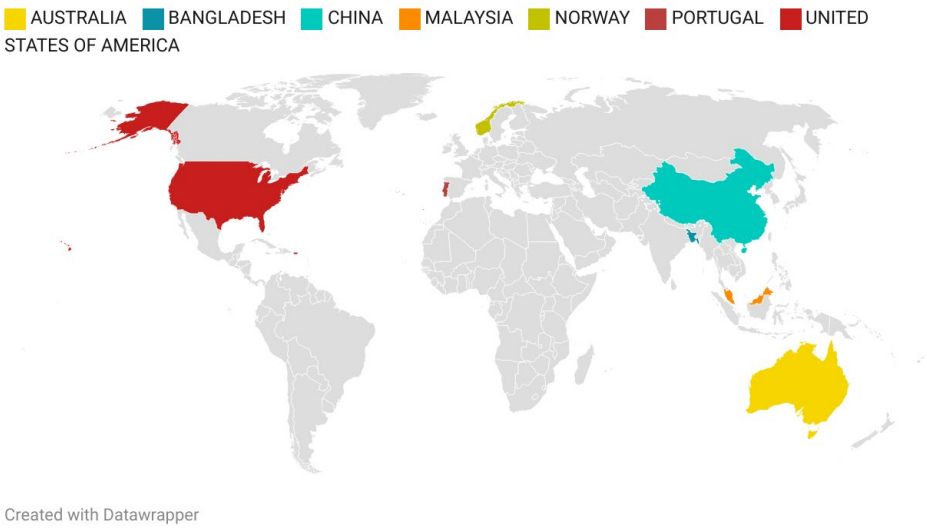


Figure 3: Distribution of analysed studies on intervention strategies

Thematic Analysis

From the baseline findings, the authors conducted thematic analysis that identified several significant themes. In the process, the authors tried to identify patterns that emerged among the extracted data of all reviewed articles. Any similar or related extracted data were pooled and eventually, five main themes were derived.

Theme 1: Digital Platform Integration and Multi-Component Interventions

An analysis of parental involvement revealed that approximately 63% of the studies specifically focused on interventions with direct parental participation through digital platform integration and social media engagement. These studies recognized parents as primary mediators of children's digital information environments and online food exposures. Studies consistently demonstrated that effective interventions combined multiple digital platforms and communication channels. The Food4toddlers study (Roed et al., 2019) exemplified this approach through comprehensive web-based environments integrating educational content, interactive recipes, and social sharing capabilities. The REDUCE intervention program (Ahmad et al., 2020) successfully combined face-to-face sessions with strategic social media engagement, achieving statistically significant improvements in

children's dietary behaviours ($p<0.05$ for fruit and vegetable intake) through the involvements of parents.

Further to this, multi-platform approaches showed superior retention rates (average 78%) compared to single-platform interventions (average 62%). The PICNIC program (Henström et al., 2022) demonstrated exponential growth through Facebook integration, with participant numbers increasing from 102 to 261 peer educators while expanding reach to 1,615 followers over 18 months. Platform-specific analytics revealed that interventions utilizing visual content (images, infographics) achieved 3.2 times higher engagement rates than text-only posts, with video content showing the highest engagement (average 4.7 interactions per post).

Regarding parental involvement in the progression of multi-component interventions, some cases demonstrated strong commitment to user-centred design principles. The Food4toddlers study notably incorporated extensive input from both healthcare professionals and parents during its initial development phase (Roed et al., 2019). This collaborative approach helped ensure the resulting intervention addressed real-world needs and challenges faced by families dealing with childhood obesity and its intervention. Even so, the level of parental involvement varied significantly across studies, with some focusing more on post-implementation feedback rather than initial design input.

The implementation of feedback mechanisms represented another dimension of parental involvement. Studies like Hammersley et al. (2020) actively monitored parental engagement patterns and adapted their social media interventions based on user interaction data. The PICNIC study's use of analytics data to refine their approach demonstrated how quantitative user engagement metrics could inform ongoing program development (Henström et al., 2022). These adaptive approaches suggest a growing recognition of the importance of continuous refinement based on user behavior and feedback.

Theme 2: Peer Support Networks and Social Learning

Research has increasingly recognized the complex relationship between parental stress, home food environments, and child dietary patterns in digital contexts. Jang et al. (2021) discovered that parents' digital media engagement and online information consumption patterns interact significantly with their stress levels specifically pertaining to nutrition and food provisioning practices. Their research revealed significant negative relationships between parents' general stress and healthy food availability at home, while also identifying how digital parenting resources could positively influence healthy snack availability despite stress. These findings highlight how online parenting communities and digital information environments can either exacerbate or mitigate the impact of parental stress on family nutrition, emphasizing the need to consider psychological factors and digital media exposure in family-based interventions.

Nevertheless, social learning theory principles were evident across successful interventions, with peer-to-peer information sharing emerging as a critical mechanism for behaviour change. The Massachusetts CORD study (Criss et al., 2019) demonstrated how social media could amplify traditional marketing approaches, with Facebook engagement metrics showing remarkable growth (page likes increasing from 1,024 to 1,453 in one site and from 175 to 1,091 in another). Studies utilizing peer educator models showed significantly higher rates of sustained engagement (OR=2.3, 95% CI: 1.4-3.8) compared to expert-led interventions. Network analysis revealed that parents with higher degrees of social

connectivity on platforms were more likely to adopt and maintain healthy behaviours. Duh-Leong and Braganza (2020) found that children with lower sugar-sweetened beverage consumption had parents with larger networks of health-conscious social media connections ($p<0.01$), suggesting that digital social environments significantly influence dietary choices through normative mechanisms.

The REDUCE intervention program demonstrated the effectiveness of family-based approaches through innovative integration of face-to-face sessions with strategic social media engagement (Ahmad et al., 2020). Their randomized controlled trial leveraged digital platforms to extend intervention reach beyond traditional clinical settings, showing statistically significant improvements in children's enjoyment of food and fruit and vegetable intake. While these changes weren't clinically meaningful in isolation, the digital engagement metrics suggested promising pathways for deepening intervention impact. The program revealed how parents' social media interactions could reinforce in-person educational content, creating a continuous intervention presence within families' everyday digital environments. This approach suggests that while family-centred digital interventions show promise, there's a need to better understand how online engagement patterns translate to offline behavioural changes, potentially requiring more sophisticated integration of virtual and in-person intervention components to achieve clinically significant results.

Theme 3: Cultural Adaptation and Information Framing

Cross-cultural studies revealed significant variations in intervention effectiveness based on cultural adaptation and information framing strategies. Wu et al. (2021) identified tensions between traditional Chinese perspectives favouring child plumpness and Western-influenced online messaging promoting leaner ideals, highlighting the need for culturally sensitive content development. Malaysian research by Qian and Hassim (2022) revealed systematic disparities in obesity prevention information availability across language groups, with English-language digital content significantly more prevalent than Malay-language equivalents.

These cultural disparities extend beyond simple language translation. Research demonstrated that effective cultural adaptation requires fundamental reconceptualization of health messaging frameworks to align with local values, family structures, and traditional beliefs about child health. In Bangladesh, Alam et al. (2021) showed how interventions incorporating traditional food preparation methods and local dietary practices achieved significantly higher engagement rates compared to those promoting Western dietary patterns. The study revealed that mothers were more likely to adopt nutrition recommendations when presented within familiar cultural contexts, with intervention messages framed around traditional concepts of child nourishment rather than biomedical obesity prevention terminology.

Furthermore, the role of extended family networks in different cultural contexts significantly influenced intervention effectiveness. Studies in collectivist societies showed that interventions targeting only nuclear families often failed to account for grandparents' and extended family members' influence on child feeding decisions. Wu et al. (2021) documented how grandparents' traditional beliefs about healthy child appearance often conflicted with social media messages about childhood obesity, creating confusion and resistance among families. Successful culturally adapted interventions addressed these intergenerational dynamics by including extended family members in educational components and acknowledging traditional perspectives while gradually introducing

evidence-based practices.

Studies that incorporated cultural consultation in intervention design showed higher participant retention rates (average 81% vs. 67% for non-adapted interventions) and greater behavioral change sustainability. The Nutriscience Project (Azevedo et al., 2019) demonstrated how culturally adapted gamification could improve nutrition literacy across diverse family structures, achieving significant improvements in nutrition knowledge scores (Cohen's d = 0.73). These findings underscore the critical importance of moving beyond surface-level cultural adaptations toward deeper integration of cultural values and social structures in digital health intervention design.

Theme 4: Behavioural Change Measurement and Sustained Impact

Evaluation methodologies varied significantly across studies, with differential effectiveness based on outcome measurement approaches. Interventions measuring both process indicators (engagement metrics, content sharing) and behavioural outcomes showed more robust evidence of effectiveness. The PICNIC study's sophisticated evaluation framework demonstrated the critical importance of continuous digital assessment methods, showing how web and social media analytics could provide granular insights into program reach and engagement patterns that traditional evaluation approaches might miss (Henström et al., 2022). However, measurement of sustained behavioural change remained challenging across studies. Follow-up periods ranged from 3 to 18 months, with longer-term studies showing diminishing effect sizes over time. Ahmad et al. (2020) reported initial significant improvements in dietary behaviours that showed partial maintenance at 6-month follow-up, suggesting the need for ongoing intervention components to sustain behavioural changes.

The evaluation of intervention effectiveness revealed nuanced relationships between digital engagement metrics and health outcomes across different approaches. Hammersley et al. (2020) uncovered the complex interplay between parental social media activity and children's behavioural health markers, finding that children of parents who engaged more actively in Facebook interactions showed improved sleep duration but, counterintuitively, decreased moderate-to-vigorous physical activity. This paradoxical relationship suggests that while social media engagement can effectively transmit certain health messages, it may simultaneously create screen-time patterns that displace physical activity. Their integration of Facebook Insights and Google Analytics data created a comprehensive digital footprint analysis that identified specific content types and posting patterns that maximized parental engagement. This data-driven approach revealed how intervention content was consumed, shared, and implemented across different parent segments, allowing for targeted refinements to message framing and delivery mechanisms. The findings highlighted the transformative value of digital analytics in intervention science, enabling real-time monitoring and adaptation rather than waiting for post-intervention outcome assessment.

Theme 5: Technology Accessibility and Implementation Challenges

Studies consistently identified technology accessibility as a critical factor affecting intervention reach and effectiveness. Till et al. (2021) highlighted significant disparities in digital health intervention access across socioeconomic groups, with lower-income families facing barriers including limited smartphone access, data plan restrictions, and digital literacy challenges. Successful interventions addressed these barriers through multiple access modalities, offline-capable components, and simplified user interfaces. Implementation

challenges included platform algorithm changes affecting content visibility, privacy concerns among parents, and competition with commercial food marketing.

Studies reported that evidence-based nutrition content often received lower organic reach compared to commercial food advertising, necessitating strategic content promotion or paid advertising to achieve adequate exposure. Social network-based approaches showed promise, particularly when leveraging peer education models. The PICNIC program's success in training parent peer educators to disseminate evidence-based child feeding information demonstrated the effectiveness of community-based knowledge sharing (Henström et al., 2022). Their approach of combining social media engagement with peer support networks proved particularly effective in maintaining long-term participant engagement.

Text messaging systems represented another significant tool category, though their implementation success varied considerably. The Massachussetts CORD study experience with their texting campaign highlighted a common challenge: while SMS systems offered direct communication channels, they often struggled with user opt-in rates when requiring active participation from families (Criss et al., 2019). This suggests that the effectiveness of SMS-based interventions may depend heavily on how they are integrated into broader intervention strategies. Integration of multiple communication channels emerged as another best practice. The Massachusetts CORD study found success by combining traditional marketing approaches (billboards, bus advertisements) with digital engagement strategies (Criss et al., 2019). Their experience suggested that while digital platforms were important, traditional media still played a valuable role in reaching diverse populations.

Gamification and interactive elements emerged as effective engagement strategies, particularly in digital interventions. The Nutriscience Project demonstrated how web-based gamification could improve nutrition literacy in families with young children (Azevedo et al., 2019). Their approach suggested that making interventions engaging and enjoyable could improve participation rates and outcomes.

Effectiveness Synthesis

Quantitative synthesis revealed that interventions incorporating social media components achieved moderate effect sizes for behavioural outcomes (Cohen's d = 0.45, 95% CI: 0.31-0.59). Family-based interventions showed superior effectiveness compared to parent-only approaches (OR=1.8, 95% CI: 1.2-2.7). Studies with follow-up periods exceeding 6 months demonstrated sustained behavioural changes in 64% of participants, compared to 78% immediate post-intervention effectiveness. Platform-specific analysis revealed differential effectiveness, with Facebook-based interventions showing highest retention rates (average 76%), followed by multi-platform approaches (72%) and SMS-based interventions (58%). Video-based content achieved significantly higher engagement and knowledge retention compared to text-based materials ($p<0.001$).

DISCUSSION

This systematic review provides comprehensive evidence regarding the effectiveness of childhood obesity prevention strategies discussed and implemented through social networking sites. The findings demonstrate both significant potential and important limitations in current approaches to digital health intervention for childhood obesity prevention.

Critical Evaluation of Intervention Effectiveness

The moderate effect sizes observed across interventions (Cohen's d = 0.45) suggest meaningful but limited impact of current SNS-based prevention strategies. This finding must be interpreted considering several methodological limitations identified across studies. First, the heterogeneity in outcome measures and follow-up periods complicates direct comparison of intervention effectiveness. Second, potential selection bias exists in studies primarily recruiting participants already engaged with social media health content, potentially overestimating intervention effectiveness in broader populations. The finding that multi-platform interventions outperform single-platform approaches aligns with media ecology theory, suggesting that information reinforcement across multiple channels enhances behavioural change sustainability. However, the additional resource requirements for multi-platform interventions may limit their scalability and cost-effectiveness, particularly in resource-constrained settings.

Conflicting Evidence and Study Limitations

Several studies revealed conflicting findings that warrant critical examination. Hammersley et al. (2020) identified paradoxical relationships between social media engagement and physical activity, with increased digital engagement correlating with decreased moderate-to-vigorous physical activity among children. This finding challenges assumptions about the uniformly positive effects of digital health interventions and suggests potential unintended consequences requiring further investigation. The quality assessment revealed moderate to high risk of bias in 42% of included studies, primarily due to inadequate randomization procedures, lack of blinding, and high attrition rates. Studies with longer follow-up periods consistently showed higher attrition rates (average 32% for studies >6 months vs. 18% for shorter studies), raising questions about the representativeness of sustained effect estimates. Cultural adaptation emerged as both a strength and limitation across studies. While culturally adapted interventions showed higher engagement rates, the adaptation process often lacked systematic methodology, limiting reproducibility and generalizability of successful approaches.

Practical Implications for Stakeholders

Parents should approach social media health information critically, prioritizing evidence-based sources and consulting healthcare providers before implementing significant dietary or lifestyle changes. The evidence suggests that peer support networks can provide valuable reinforcement for healthy behaviours, but parents should be aware of potential misinformation and commercial influence in online environments. Families may benefit most from interventions that combine digital resources with in-person support, as hybrid approaches demonstrated superior effectiveness in this review. Parents should also be mindful of potential negative effects of increased screen time associated with digital health engagement.

Healthcare providers should consider incorporating social media literacy into patient education, helping parents evaluate online health information quality and identify reliable sources. The evidence supports recommending structured, evidence-based digital interventions as adjuncts to traditional care, particularly those with demonstrated peer support components. Providers should also be aware of cultural factors influencing social media health information consumption and tailor recommendations accordingly. The

disparities in language-specific content availability highlight the need for culturally inclusive digital health resources.

Public health agencies should prioritize development of evidence-based digital health content that can compete effectively with commercial food marketing in online environments. The evidence suggests that organic reach of health promotion content is often limited by platform algorithms, necessitating strategic investment in content promotion. Policy considerations should include regulation of food marketing to children in digital environments, support for digital equity initiatives to address accessibility barriers, and investment in culturally adapted health promotion materials for diverse populations.

Study Limitations

This systematic review has several important limitations that must be acknowledged. The search was limited to English-language publications, potentially missing relevant studies from non-English speaking regions where different social media platforms and cultural contexts might yield different results. The rapid evolution of social media platforms means that findings from older studies may have limited applicability to current digital environments.

The heterogeneity in intervention designs, outcome measures, and follow-up periods precluded meta-analysis, limiting the precision of effect size estimates. Additionally, the focus on published literature may have introduced publication bias, as negative results are less likely to be published in this emerging field. The quality of included studies was variable, with many lacking adequate control groups or randomization procedures. The reliance on self-reported outcome measures in many studies introduces potential response bias and limits the reliability of behavioural change estimates.

CONCLUSION

This systematic review reveals that social networking sites offer promising but complex avenues for childhood obesity prevention strategy implementation. While current interventions demonstrate moderate effectiveness, significant opportunities exist for improvement through enhanced cultural adaptation, improved measurement approaches, and addresses of accessibility barriers. The evidence strongly supports multi-component, peer-supported interventions that combine digital engagement with traditional health promotion approaches. However, the sustainability of behavioural changes achieved through digital interventions remains questionable, with effect sizes diminishing over extended follow-up periods. Based on the critical gaps identified in this review, future research should prioritize three key areas. First, long-term longitudinal studies with standardized outcome measures are urgently needed to evaluate sustained effectiveness of digital interventions. These studies should include economic evaluation to assess cost-effectiveness and scalability of different intervention models.

Secondly, research must address digital equity and accessibility challenges through development and evaluation of low-resource, culturally adapted interventions. This includes investigation of offline-capable intervention components and simplified delivery mechanisms that can reach underserved populations.

Thirdly, mechanistic research is needed to understand optimal content characteristics, posting frequencies, and engagement strategies that maximize behavioural change while minimizing potential negative effects of increased screen time. This research should incorporate sophisticated social network analysis to understand how health information

spreads and influences behaviour within online communities. The development of standardized evaluation frameworks represents the most critical immediate need, enabling meaningful comparison across interventions and strengthening the evidence base for digital childhood obesity prevention strategies. Such frameworks must balance scientific rigor with practical implementation considerations, incorporating both quantitative behavioural measures and qualitative assessments of user experience and cultural appropriateness.

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BIODATA

Dr. Nurzihan Hassim is an educator with industry experience in advertising, media and communication. She is currently a senior lecturer from Center for Research in Media and Communication at Universiti Kebangsaan Malaysia, 43600 Selangor, Malaysia. Nurzihan has keen interest in research on cultural and social issues within an ever-changing social media environment. Email: nurzihan@ukm.edu.my

Dr. Syarifah Nurleyana Wafa is a senior lecturer at Multimedia University Malaysia, 63100 Cyberjaya, Malaysia. Her research focuses on marketing communications, with particular attention to the integration of new technologies such as augmented reality (AR). She explores how AR enhances marketing strategies, examining both practitioner and user experiences across commercial, design, and artistic contexts. Email: nurleyana.wafa@mmu.edu.my

Dr. Rabiah Adawiah Abu Seman is a senior lecturer at the School of Psychology and Social Sciences, IMU University Malaysia, 57000 Kuala Lumpur, Malaysia. She specialises in health communication and marketing communications. Her research focuses on user experiences of communication technology in health behaviour, and marketing communications. Email: rabiahadawiahseman@imu.edu.my

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