

Obesity as a Risk Factor for Cardiovascular Diseases: A Systematic Review and Meta-Analysis

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Abstract: Obesity has been widely recognized as a major risk factor for cardiovascular diseases (CVDs), yet the extent of its impact on various types of CVDs remains a topic of debate. This study presents a systematic review and meta-analysis of 42 cohort and case-control studies published between 2010 and 2023, evaluating the association between obesity and incidents of CVD, such as coronary heart disease, stroke, and heart failure. The meta-analysis revealed that individuals with a body mass index (BMI) ≥ 30 were 2.4 times more likely to develop CVDs compared to those with a normal BMI (RR=2.4; 95% CI: 2.1–2.7). The risk increased with higher BMI and visceral fat accumulation. Notably, abdominal obesity showed a stronger association with ischemic stroke. These findings highlight the urgent need for population-wide obesity reduction strategies as a primary prevention measure against CVDs.

Keywords: obesity, cardiovascular disease, systematic review, meta-analysis, BMI, abdominal obesity.

1. INTRODUCTION

The development of digital technology has significantly changed the marketing landscape. Digital marketing has become one of the main strategies used by companies to increase competitiveness and operational effectiveness. One important aspect of digital marketing is the use of social media, which allows companies to reach a wider audience without geographical limitations. Instagram and TikTok, as popular social media platforms, have become effective marketing tools in increasing brand awareness and sales. Utilizing marketing strategies through these platforms allows companies to get closer to consumers and increase direct interaction. However, although digital marketing through Instagram and TikTok offers many benefits, there are still various research phenomena that show challenges in its implementation. One phenomenon that emerged was how the effectiveness of digital marketing strategies in increasing sales still varies depending on the approach used by the company. For example, choosing content that is less interesting or not in accordance with trends can lead to low consumer engagement. In addition, the ever-evolving social media algorithm also requires companies to continue to adapt so that their marketing strategies remain relevant.

Each variable in this study has its own problems. In the context of digital marketing, the challenge lies in how companies can optimize marketing strategies in order to attract attention and increase sales conversions. In the social media marketing variable, the problem that often occurs is the difficulty in building high engagement with the audience. Meanwhile, in the sales variable, the main challenge is how to ensure that the digital marketing strategy implemented really has a significant impact on increasing company revenue. In the literature review, there is a theoretical gap that is the background of this study. Most previous studies have focused more on the effectiveness of digital marketing in general, but there are still few

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studies that specifically discuss the comparison of the effectiveness of marketing strategies between Instagram and TikTok. In addition, most studies have not highlighted how the algorithms of these two platforms play a role in determining the level of success of digital marketing. Therefore, this study attempts to fill this gap by analyzing the implementation of digital marketing strategies through Instagram and TikTok and their impact on increasing sales.

The novelty of this study lies in its specific focus on digital marketing strategies through Instagram and TikTok and how these strategies contribute to increasing sales at PT. Akasa Kreasi Bersama. By highlighting the differences in effectiveness between the two platforms, this study can provide new insights into more optimal marketing strategies for businesses in the digital era. The urgency of this research is increasing along with technological developments and changes in consumer behavior that are increasingly dependent on social media in searching for product information. By understanding how effective digital marketing strategies can be implemented on Instagram and TikTok, companies can increase their competitiveness and achieve better sales targets. In addition, the results of this study can also contribute to the academic world in developing digital marketing theories in the modern era. Based on this background, the main objective of this study is to analyze digital marketing strategies through the social media platforms Instagram and TikTok in increasing sales at PT. Akasa Kreasi Bersama. This study is expected to provide an in-depth understanding of the effectiveness of digital marketing strategies and provide recommendations for companies in optimizing the use of social media to improve their business performance.

2. Theoretical Review

1. Digital Marketing

Digital marketing, or digital marketing, is an effort to promote products or services through electronic media or the internet. According to research, knowledge about digital marketing implementation is the main factor influencing the success of digital marketing adoption in business. Digital marketing offers a variety of significant benefits to businesses, especially in increasing competitiveness and operational efficiency. One of the main benefits is increased brand visibility and expanded market reach. By leveraging digital platforms such as social media and search engines, companies can reach a wider audience without geographical limitations, thereby expanding market share and increasing sales potential.

In addition, digital marketing allows companies to increase consumer engagement. Through relevant and interactive content, companies can build stronger relationships with customers, increase loyalty, and create better user experiences. Direct interaction through digital platforms also allows companies to get real-time feedback, which can be used to improve their products or services. Another benefit of digital marketing is the ability to measure campaign performance more accurately. With digital analytics tools, companies can track the effectiveness of their marketing strategies, understand consumer behavior, and

adjust their approach based on the data obtained. This allows for more informed and efficient decision making in allocating marketing resources. The strategies in digital marketing business discussed in this journal include various approaches to increasing marketing effectiveness with the help of internet technology. Digital marketing allows companies to reach a wider market at a lower cost than conventional marketing. In an ever-evolving environment, digital marketing strategies are essential to ensure products or services can reach consumers effectively.

One of the main strategies in digital marketing is the utilization of various techniques and tools available, such as affiliate marketing, digital advertising, content marketing, Search Engine Marketing (SEM), mobile marketing, email marketing, social media marketing, Search Engine Optimization (SEO), and data analysis. With these techniques, businesses can target consumers more specifically and efficiently, increase brand awareness, and optimize sales. Digital marketing strategies can also be analyzed using several models, such as the Porter Five Forces analysis to understand market competition, the 4P theory (Product, Price, Place, Promotion) which has evolved into 5P with the addition of " People, " and SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) to evaluate business conditions and determine the right marketing steps. By implementing these strategies, companies can ensure that they remain competitive in the dynamic digital world. Digital marketing offers huge advantages due to its wide reach, relatively lower costs, and flexibility in adjusting strategies according to market response. Therefore, businesses that want to grow in the digital era must adopt the right digital marketing strategy and continue to innovate in accordance with technological developments and consumer behavior.

2. Social Media Marketing

Social media marketing is a digital marketing strategy that uses social media platforms to promote products, services, or brands to a wider audience. The main goals of social media marketing include increasing brand awareness, engaging with consumers, and ultimately, increasing sales. By using social media, companies can interact directly with customers, get feedback, and build a loyal community. Social media plays a significant role in digital marketing, especially in increasing the effectiveness of product and service promotions. Platforms such as Facebook, Instagram, Twitter, and TikTok allow businesses to reach a wider audience, interact directly with consumers, and build more personal relationships. Through engaging and interactive content, companies can increase brand awareness and customer loyalty.

In addition, social media provides useful data and analytics for companies to understand consumer behavior. Information such as demographics, preferences, and responses to marketing campaigns can be easily accessed, allowing for more targeted marketing strategy adjustments. This helps companies in optimizing marketing budgets and achieving better results. However, the use of social media in digital marketing also faces challenges, such as

online reputation management and the need to continuously adapt to rapidly changing trends. Therefore, companies need to have a flexible and responsive strategy to the dynamics of social media to maximize its benefits in digital marketing.

3. Instagram and Tiktok Marketing

Instagram and TikTok have become dominant social media platforms in digital marketing strategies, each offering unique advantages for businesses. **Instagram Marketing Advantages:** Instagram is known for its wide and diverse user base, allowing businesses to reach a variety of market segments. Features such as Stories, Reels, and IGTV provide flexibility in presenting content, both in the form of photos and videos. The ability to showcase products through high-quality images and short videos makes it easier for businesses to build a strong brand image. Additionally, integration with shopping features allows users to make purchases directly through the platform, thereby increasing sales conversions. Interaction through comments and direct messages also strengthens the relationship between brands and consumers.

TikTok Marketing Advantages: TikTok offers a different approach by focusing on creative, short-form video content that can go viral easily. TikTok's algorithm allows content to reach a wider audience, even without a large following. This provides an opportunity for small businesses to gain high visibility in a short period of time. Features like Duet and Stitch encourage user interaction and participation in trends, which brands can leverage to increase engagement. In addition, TikTok's user demographics are dominated by the younger generation, making it ideal for targeting the teen and young adult market. The choice between Instagram and TikTok as a marketing platform should be adjusted to business goals, product characteristics, and target audience demographics. Understanding the advantages of each platform will help in designing an effective and efficient marketing strategy. Instagram and TikTok algorithms play a significant role in determining the content displayed to users, so understanding how these algorithms work is essential for a digital marketing strategy. **Instagram Algorithm:** Instagram uses an algorithm that prioritizes content based on several key factors:

1. **User Relationships:** Content from accounts that users frequently interact with, such as through likes, comments, or direct messages, tends to appear more frequently in their feeds.
2. **Timeliness:** Newest posts are given priority, ensuring users see relevant and up-to-date content.
3. **Interests:** The algorithm analyzes the types of content users frequently view or like, then displays more similar content.
4. **Frequency of Use:** Users who rarely open the app may only see the content they deem most relevant, while active users will see a wider variety of content.

TikTok Algorithm: TikTok is known for its “For You Page” (FYP) algorithm that displays videos based on an individual’s preferences. Factors that influence the TikTok algorithm include:

1. **User Engagement:** Videos that get likes, comments, or shares from users will appear more often in their FYP.
2. **Video Information:** Details such as captions, hashtags, and sounds used help the algorithm understand the content and its relevance to users.
3. **Account and Device Settings:** Language preferences, location, and device type also affect the type of content displayed.

A deep understanding of these algorithms allows marketers to optimize their content strategies, ensuring higher reach and engagement across both platforms. Instagram and TikTok have become key platforms in digital marketing strategies, each offering a unique approach to reaching and engaging audiences. Here are some effective marketing strategies for both platforms: **Instagram Marketing Strategy:**

1. **Using Instagram Takeovers:** Allowing an individual or influencer to take over your business’s Instagram account for a set period of time can increase audience engagement, expand reach, and strengthen branding. This strategy allows for a mutually beneficial collaboration between the account owner and the individual doing the takeover.
2. **Proper Hashtag Utilization:** Using relevant and popular hashtags can increase the visibility of your content. Additionally, creating a campaign in the form of a challenge with a specific hashtag can encourage user participation and make content go viral.
3. **Collaboration with Influencers:** Working with influencers who are in line with your product and brand can help reach a wider audience and increase consumer trust in the products or services offered.

Marketing Strategy on TikTok:

1. **Creative and Interactive Content Creation:** TikTok emphasizes creative short-form video content. Creating engaging challenges with specific hashtags can increase user engagement and make your content more discoverable to a wider audience.
2. **Collaborate with TikTok Influencers:** Working with TikTok influencers who have a following that aligns with your target market can increase brand visibility and credibility. Influencers can help promote your products or services through authentic and engaging content.
3. **Use of Popular Music and Effects:** Utilizing trending music, sounds, or effects on TikTok can increase the chances of your content appearing on users’ “For You” pages, thereby reaching a wider audience.

By implementing these strategies, businesses can maximize the potential of Instagram and TikTok as effective marketing tools in today's digital era.

4. **Sale**

Sales is one of the functions in marketing, where the goal is for the company to make a profit so that the company's operational activities continue to run. Sales activities are the company's main income because if product or service sales activities are not managed properly, the expected sales targets will not be achieved and income will decrease, which can directly cause losses to the company. The definition of sales according to (Sumiyati and Yatimatun, 2021), is the purchase of something (goods or services) from one party to another by getting compensation from that party. Sales are a source of company income, the greater the sales, the greater the income received by the company. It can be concluded that sales are the process of giving something to other people/buyers with the aim of obtaining money as compensation or payment.

Sales increases are influenced by various factors that can be categorized into internal and external factors of the company.

Internal Factors:

1. Condition and Ability: The seller's knowledge and skills regarding the product, marketing strategy, and ability to interact with consumers greatly affect the success of the sale. A competent seller can convince consumers to make a purchase.
2. Capital: The availability of sufficient capital allows the company to carry out promotions, expand distribution networks, and improve product quality, all of which contribute to increasing sales volume.
3. Company Organizational Condition: An efficient organizational structure and good management can increase productivity and operational effectiveness, which in turn can increase sales.

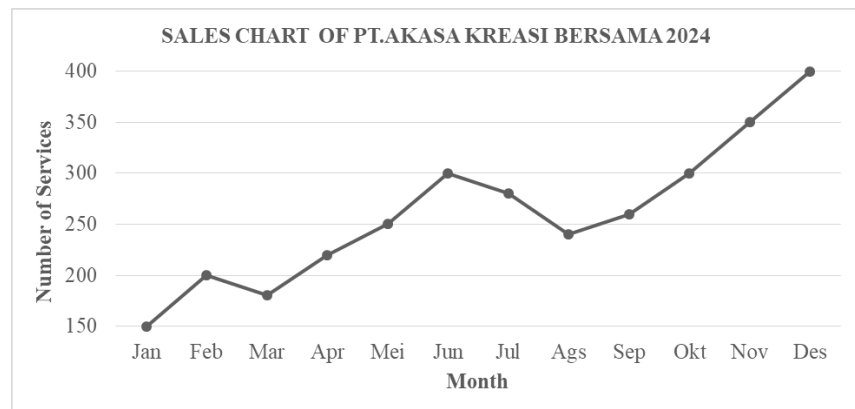
External Factors:

1. Market Conditions: Consumer demand, competition, and market trends affect sales volume. Companies must understand market dynamics to adjust their sales strategies.
2. Other Factors: Activities such as bazaars or exhibitions and involvement in the business community can increase product visibility and attract more consumers.
3. Positive reviews from customers: Customers who have used visa services can be a deciding factor for potential future buyers, increasing credibility, confidence and attracting more consumers.

5. Buying decision

According to (Zusrony Edwin, 2021) Decision making is an individual activity that is directly involved in obtaining and using the goods or services offered. While the decision to buy is a problem-solving activity carried out by individuals in selecting alternatives as the most appropriate action in buying by first going through the stages of the decision-making process (Firmansyah, Anang, 2018).

The following is a sales graph of PT. Akasa Kreasi Bersama (Visa & Passport Services) in one year (2024):



Based on the graph above , there is a change in visa sales throughout the year with a general trend showing an increase. In January, visa sales were recorded at their lowest, at around 150 services . Then, sales rose quite sharply in February to around 200 services , although in March there was a slight decline to around 180 services . Sales rose again from April to June, with a peak recorded in June at around 300 services , which was the first high figure all year.

After June, sales dropped in July and continued to decline until August, reaching the second lowest point below 250 services . However, sales started to increase gradually again from September and reached the highest figure in December, around 400 services . From the data above , it can be concluded that:

1. Visa sales tend to increase towards the middle to end of the year.
2. The biggest increase occurred in December.
3. Temporary declines occurred in March, July, and August.

This phenomenon may reflect an increase in visa demand ahead of holidays or the end of the year, as well as fluctuations influenced by seasonal factors, policies, or people's travel needs.

3. Research Methods

This study uses a qualitative descriptive approach to analyze the implementation of digital marketing strategies through social media platforms Instagram and TikTok in increasing sales at PT. Akasa Kreasi Bersama. This approach was chosen because it allows researchers to gain an in-depth understanding of the process, mechanism, and effectiveness of the digital marketing strategies implemented. The research was conducted during the internship period, namely from January 6 to February 7, 2025, at the location of PT. Akasa Kreasi Bersama

located at Jl. Garu 3 No. 48. Data was collected through several techniques, namely in-depth interviews, participant observation, and document studies. Interviews were conducted with various related parties at PT. Akasa Kreasi Bersama, including marketing managers, operational staff, and customers involved in transactions via Instagram and TikTok. This interview aims to obtain information regarding the digital marketing strategies implemented, the obstacles faced, and the perceptions of the relevant parties regarding the effectiveness of these strategies.

Participatory observation was conducted by researchers being directly involved in daily operational activities at PT. Akasa Kreasi Bersama. Through this observation, researchers can directly observe how digital marketing strategies are implemented, how content is produced and published, and how interactions between companies and customers occur on digital platforms. These observations provide empirical data that is very useful for understanding the context and dynamics in the field. Document study involves collecting and analyzing various documents related to digital marketing policies and procedures at PT. Akasa Kreasi Bersama. The documents analyzed included operational manuals, sales reports before and after implementing digital strategies, and engagement data on social media. This document analysis helps to validate the data obtained from interviews and observations, and provides a more comprehensive picture of the effectiveness of digital marketing strategies. The data obtained were analyzed qualitatively using thematic analysis techniques. Researchers identified key themes emerging from the data, such as the types of content that were most effective, levels of customer engagement, and the impact of digital marketing on increasing sales. This analysis enables researchers to draw conclusions and recommendations based on solid empirical findings. By using this research method, it is expected that the research results can provide in-depth and comprehensive insights into the implementation of digital marketing strategies through Instagram and TikTok at PT. Akasa Kreasi Bersama. The findings of this study are expected to provide practical contributions to companies in increasing the effectiveness of digital marketing and strengthening competitiveness and customer loyalty.

4. Results and Discussion

The results of this study indicate that digital marketing strategies through social media platforms Instagram and TikTok have a significant impact on increasing sales at PT. Akasa Kreasi Bersama. Both platforms have unique characteristics that allow companies to reach a wider audience and increase engagement with consumers. Instagram with visual features such as Stories, Reels, and IGTV is an effective tool in building a strong brand image. On the other hand, TikTok offers an interaction-based algorithm that allows content to go viral faster, even for business accounts that do not yet have many followers. One of the main findings of this study is how the content strategy implemented on both platforms affects engagement rates and sales conversions. Interesting content that is in line with current trends tends to get a better response from users, whether in the form of likes, comments, or shares. This is in

line with digital marketing theory which emphasizes the importance of creating relevant and interactive content to attract audience attention. However, the main challenge faced is the ever-evolving changes in social media algorithms, so companies must always adapt so that marketing strategies remain effective.

In addition to the content aspect, this study also found that the success of digital marketing at PT. Akasa Kreasi Bersama is influenced by the use of paid features such as Instagram Ads and TikTok Ads. The use of paid advertising allows companies to target their ads to more specific market segments based on user demographics, interests, and behavior. With the right strategy, these ads can significantly increase sales conversions. However, the effectiveness of paid advertising also depends on optimal budget allocation and selection of the appropriate target audience. In addition, the results of the study also show that marketing strategies through collaboration with influencers play a major role in increasing product appeal and building consumer trust. Influencers with a follower base that matches the company's target market can help increase brand credibility and influence consumer purchasing decisions. The use of this marketing technique is especially effective on TikTok, given the characteristics of the platform which is heavily influenced by trends and recommendations based on user interactions.

Overall, digital marketing strategies through Instagram and TikTok have had a positive impact on PT. Akasa Kreasi Bersama. However, there are several challenges that must be considered, such as changes in algorithms, increasingly fierce competition, and the need for continuous content innovation. Therefore, companies are advised to continue to evaluate the effectiveness of the marketing strategies implemented, and adjust their approaches according to developments in consumer trends and preferences. By understanding the characteristics of each platform and implementing the right strategy, companies can optimize their digital marketing to achieve maximum sales growth.

5. Conclusions and Suggestions

Based on the results of the research that has been conducted, it can be concluded that the digital marketing strategy through the social media platforms Instagram and TikTok has a significant impact on increasing sales at PT. Akasa Kreasi Bersama. Instagram, with visual features like Stories, Reels, and IGTV, helps companies build brand image and increase customer engagement. Meanwhile, TikTok offers higher viral potential through its user interaction-based algorithm, allowing companies' content to reach a wider audience in a short time. Utilizing marketing strategies that suit the characteristics of each platform is the main key to achieving digital marketing effectiveness. In addition to choosing the right platform, this study also found that the success of digital marketing is greatly influenced by the quality of content and audience engagement. Interesting, trend-relevant, and interactive content can increase engagement and ultimately drive sales conversions.

In addition, utilizing paid advertising features such as Instagram Ads and TikTok Ads is also an effective strategy in reaching a more specific target market based on user demographics and preferences. The use of influencer marketing on both platforms has also been shown to increase brand credibility and build consumer trust in the products offered. However, the implementation of this digital marketing strategy also faces several challenges, such as dynamic changes in social media algorithms, increasingly tight business competition, and the need for continuous content innovation. Therefore, companies must continue to evaluate and adjust their strategies to remain relevant to developments in market trends and consumer behavior. With a deep understanding of the characteristics of each platform and the implementation of the right marketing strategy, PT. Akasa Kreasi Bersama can optimize the use of Instagram and TikTok as effective digital marketing tools in increasing the company's competitiveness and business growth.

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