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Original Research Article

A web-based cross-sectional observational study on the analysis of information on diabetes on a social media platform (Instagram)

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ABSTRACT

Background: Information related to health and chronic diseases is freely accessible to the public via social media platforms, such as Instagram. Proper knowledge and interventions can result in the management of diseases and improve patient behaviour while misinformation leads to poor patient outcomes.

Aims: To analyse the relevance and authenticity of information about diabetes available on the social media platform (Instagram).

Materials and Methods: The study was a web-based cross-sectional observational study without direct human participation. Data was collected from the top-performing 600 posts on Instagram, under the top six key search words related to diabetes and its management. The collected data was further analysed in Microsoft Excel and reviewed according to the latest WHO guidelines on diabetes.

Results: Only 448 out of 600 posts were found to be relevant to the study. While only 142 posts (31.70%) had amassed more than 500 likes, none of the posts had more than 500 comments each. 176 posts (39.26%) originated from unverified sources whereas 46 posts (10.27%) were contributed by doctors. Only 79 posts (17.63%) had any description of diabetes as a disease. Information on prevalence, aetiology, prevention, treatment or mortality was unavailable in 413 (92.19%), 381 (85.04%), 309 (68.97%), 338 (75.45%) and 427 (95.31%) posts respectively. The authenticity of the information was not determined in 221 posts (49.33%) whereas misinformation was seen in 19 posts (4.24%).

Conclusions: Social media platforms are beneficial to public health, provided verified information and guidelines issued by organisations such as the World Health Organisation are implemented and promoted.

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1. Background

Diabetes is one of the largest disease burdens in the world, affecting over 425 million people in 2017. It is projected to affect over 629 million people by 2045.¹ It is rightly called the epidemic of the century.² Countries in the Western Pacific region have the highest prevalence of diabetes at around 37.5% while there is a 10.9% prevalence of the

disease in the Middle East and North Africa.² This chronic disease condition is influenced by non-modifiable disease factors such as genetics, and modifiable factors such as diet, exercise and lifestyle.^{1,3} Hence, advice about the modifiable risk factors and triggers aids to prevent and even reverse this condition in the affected.⁴

There has been a recent steady increase in social media usage all over the world at a rate of almost 12% over the past decade with over 4.62 billion social media users, according

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to the Global Data Report, in January, 2022.⁵ This growth has also been mirrored in developing countries such as India, with around 21.0% of the Indian population above 13 years, using Instagram as of January 2022.⁶

Multiple meta-analyses about the usage of social media, as intervention channels for non-communicable diseases, to improve patient behaviour and disease outcomes have reported beneficial results.^{7,8} Healthcare professionals and health and wellness institutions can use social media as a channel to improve patient knowledge about diabetes.⁸ Various authorities such as the Norwegian government have used social media as platforms for communication and advertisements in times of COVID-19 to increase the rate of testing.⁷ Studies have found that social media can increase knowledge and information about diabetes and it is a preferred means of communication used by patients with their healthcare professionals.⁹ However, detrimental information and erroneous interventions may adversely affect patient outcomes.¹⁰

2. Aim

To analyse the relevance and authenticity of information about diabetes available on the social media platform (Instagram).

3. Objectives

- 1. To compile data from the top performing posts on Instagram tagged under relevant keywords of diabetes.
- 2. To assess the relevance and authenticity of the said data concerning the latest WHO guidelines about diabetes.

4. Materials and Methods

This was a cross-sectional type of web-based observational study without directly involving human participants, completed over a period of one week (third week of August 2022). An estimated 7.7 million posts under the keyword diabetes (diabetes) were noted. Out of the several search keywords related to diabetes, the top six were selected to incorporate different areas of diabetes, namely diabetes, diabetesawareness, diabetesdiet, diabeteslife, diabetesmanagement and diabetestreatment, to be studied without any distinction between the different types of diabetes. The study was conducted among the top-performing hundred posts tagged under each of the six hashtags, making a total of 600 posts. Each of the researchers chose one/two hashtags and collected data using Google Forms. The collected data were analysed by each researcher using Microsoft Excel to prevent any duplication or errors. Any uncertainty regarding any of the particulars was discussed with the mentor and resolved.

The data collected were under the following parameters:

- 1. Attributes of the post (image or a video, relevance to the disease diabetes mellitus, the language used, whether a meme/cartoon)
- 2. Duration since it was posted (less than a month, between one to six months, more than six months)
- 3. Level of interaction with the audience (number of likes and comments)
- 4. Level of qualification of the source account (doctors, healthcare professionals, health-related website, news, others)
- 5. Information about the disease (diabetes, its prevalence, aetiology, prevention, treatment or mortality)
- 6. Source of information (true or false) according to the latest WHO guidelines on diabetes¹¹

4.1. Inclusion and exclusion criteria

The posts that were included in our study satisfied the following criteria:

- 1. Relevant to the disease diabetes mellitus or those who are affected by it
- 2. Tagged under one or more of the six most searched hashtags under diabetes
- 3. In a language that was either English or Hindi

The posts that did not satisfy the above criteria were excluded from our study.

Table 1: Number and percentage of posts tagged under each hashtag/keyword (N = 448)

Hashtag Used	No: of posts (percentage)
Diabetes	85 (18.97%)
Diabetesawareness	82 (18.30%)
Diabetesdiet	56 (12.50%)
Diabeteslife	79 (17.63%)
Diabetesmanagement	79 (17.63%)
Diabetestreatment	67 (14.96%)
Total	448 (100.00%)

Table 2: Observed attributes of the posts (N = 448)

Attribute observed (No: of posts, percentage)			Total no: of posts (percentage)
Type of the post	Images (424, 94.64%)	Videos (24, 5.36%)	448 (100.00%)
Language used	English or Hindi(436, 97.32%)	Other(12, 2.6%)	448 (100.00%)
Data Representation	Meme/Cartoon (810.71%)	Other(400, 89.29%)	448 (100.00%)

Table 3: Duration of time between the time of publishing and the present study (N = 448)

Duration of time	No: of posts (percentage)
Under 1 month	274 (61.16%)
1 – 6 months	137 (30.58%)
More than 6 months	37 (8.26%)
Total	448 (100.00%)

Table 4: Contributory sources of the published posts (N = 448)

Source of the published posts	No: of posts (percentage)
Doctor	46 (10.27%)
Health and wellness website	123 (27.46%)
Dietitian	87 (19.42%)
News Agency	16 (3.57%)
Others	176 (39.29%)
Total	448 (100.00%)

Table 5: Level of interaction in terms of no: of likes per published post (N = 448)

No: of likes per post	No: of posts (percentage)
Less than 50	134 (29.91%)
50 - 100	61 (13.62%)
100 - 500	111 (24.78%)
More than 500	142 (31.70%)
Total	448 (100.00%)

Table 6: Level of interaction in terms of no: of comments per published post (N = 448)

No: of comments per post	No: of posts (percentage)
Less than 50	428 (95.54%)
50 - 100	14 (3.13%)
100 - 500	6 (1.34%)
More than 500	0 (0.00%)
Total	448 (100.00%)

5. Results

Out of the 7.7 million posts on Instagram under the keyword diabetes, the top-performing hundred posts under each of the six keywords/hashtags were analysed in our study, giving a sample size of 600 posts. Out of a total of 600 responses, only 448 posts were found to be relevant to the study. There were 85 posts (18.97%) tagged under *diabetes*, 82 posts (18.30%) under *diabetesawareness*, 56 posts (12.50%) under *diabetesdiet*, 79 posts (17.63%) under *diabeteslife*, 79 posts (17.63%) under *diabetesmanagement* and 67 posts (14.96%) under *diabetestreatment*. (Table 1)

Table 7: Information about diabetes available in each published post (N = 448)

Parameter observed	Yes (No: of posts, percentage)	No (No: of posts, percentage)	Total (No: of posts, percentage)
Description	79 (17.63%)	369 (82.37%)	448 (100.00%)
Prevalence	35 (7.81%)	413 (92.19%)	448 (100.00%)
Aetiology	67 (14.96%)	381 (85.04%)	448 (100.00%)
Prevention	139 (31.03%)	309 (68.97%)	448 (100.00%)
Treatment	110 (24.55%)	338 (75.45%)	448 (100.00%)
Mortality	21 (4.69%)	427 (95.31%)	448 (100.00%)

Table 8: Authenticity of information in the published posts (N = 448)

Authenticity of published information	No: of posts (percentage)
True	208 (46.43%)
False	19 (4.24%)
Cannot be determined	221 (49.33%)
Total	448 (100.00%)

Among the 448 relevant posts, 424 posts (96.64%) were images and 24 posts (5.36%) were videos. Most of the Instagram posts (436 posts, 97.32%) were in English or Hindi, compared to 12 posts (2.60%) in other languages. There were 48 posts (10.71%) that were represented as memes/cartoons while 400 posts (89.29%) were not presented as such. (Table 2)

Out of 448 posts, 274 posts (61.16%) and 137 posts (30.58%) were published in under a month and six months duration respectively whereas 37 posts (8.26%) were posted at a duration of more than six months. (Table 3)

Sources other than qualified professionals contributed to 176 posts (39.26%). While 123 posts (27.46%) originated from health and wellness sites, 87 posts (19.42%) from dietitians, and 16 posts (3.57%) from news agencies, doctors contributed to only 46 posts (10.27%). (Table 4)

Our study revealed that 134 posts (29.91%) gathered less than 50 likes, 61 posts (13.62%) attained likes ranging between 50 and 100, 111 posts (24.78%) received likes ranging between 100 and 500 while 142 posts (31.70%) had amassed more than 500 likes. (Table 5)

Similarly, the study also revealed that 428 posts (95.54%) gained less than 50 comments, 14 posts (3.13%) attained comments ranging between 50 and 100, six posts (1.34%) received comments ranging between 100 and 500 while none of the posts (0.0%) had obtained more than 500 comments. (Table 6)

It was found that only 79 posts (17.63%) contained any description of diabetes as a disease, while 369 posts (82.37%) did not have any description of diabetes at all. Information about the prevalence, aetiology, prevention, treatment or associated mortality was discussed in 35 (7.81%), 67 (14.96%), 139 (31.03%), 110 (24.55%) and 21 (4.69%) posts respectively. On the contrary, no information about the prevalence, aetiology, prevention, treatment or associated mortality was discussed in 413 (92.19%), 381 (85.04%), 309 (68.97%), 338 (75.45%) and 427 (95.31%) posts respectively. (Table 7)

The authenticity of the information presented via the published posts was unable to be determined in 221 posts (49.33%). Authentic and verified information was published in 208 posts (46.43%) and misinformation was reported in 19 posts (4.24%). (Table 8)

6. Discussion

The increasing prevalence of diabetes has led to a growing need for research on the disease. One way to gather information on diabetes is through an analysis of content published on social media. In this study, we focused on analysing posts on Instagram that included relevant hashtags related to diabetes and its management.

Out of 600 posts selected from 7.7 million posts tagged under diabetes and its related hashtags on Instagram, only 448 posts were found to be relevant to this study. This implies that a significant part of the information circulated on social media is unreliable and without any proven evidence.

Out of the six most used hashtags related to diabetes and its management, *diabetes* was used to publish the highest number of posts at 18.97%, closely followed by 18.30% under *diabetesawareness*, 17.63% each under *diabeteslife* and *diabetesmanagement*, 14.96% under *diabetestreatment* and 12.50% under *diabetesdiet*. This indicates that more posts could be published under important hashtags such as *diabetesdiet* and *diabetestreatment* which will enhance patient behaviours and treatment outcomes.

Our study revealed that 96.64% of the published posts were images whereas only 5.36% of the posts were videos, indicating that images were more commonly used than videos to circulate information on Instagram. The languages English or Hindi were used to publish 97.32% of the posts, while posts in other languages were just 2.60%. This could be attributed to English and Hindi being the languages used in the geographical location of the researchers involved. Out of the data collected, only 10.71% of posts were represented in the form of memes/cartoons, making the information less memorable for the target audience.

The study also showed that most of the information on social media about diabetes was recent, with 61.6% of the posts being posted in under a month, depicting that focus is being driven to newer posts than older ones, enabling

the circulation of more recent information over the outdated ones.

Another finding showed that as high as 39.29% of posts originated from unverified sources such as bloggers, patients and influencers. The contributions from verified sources such as health and wellness sites, dieticians and news agencies were 27.46%, 19.42% and 3.57% respectively. Doctors published as less as 10.27% of the posts about diabetes. This could give rise to confusion regarding the disease of diabetes and its management, with the target audience at the risk of trusting and following the information which had no proven evidence or credibility.

The study also found that posts related to diabetes had suboptimal audience interaction on Instagram. The percentage of posts with more than 500 likes was as less as 31.70% whereas only a nominal 4.46% of the posts had gathered more than 50 comments. This may imply that either the target audience was not reached effectively or the audience did not feel the need to interact with the posts. MacLean et al argue that the target audience may also have an issue with understanding the published content, which may also result in a suboptimal interaction.¹²

Furthermore, posts published without information regarding diabetes (i.e., description, prevalence, treatment, prevention and mortality) were significantly more (82.37%, 92.19%, 85.04%, 68.97%, 75.45% and 95.31% respectively) than the posts published with information about the same. Apart from the reduced impact of such posts on the audience, this could also mislead them by providing insufficient information that is required for the understanding of their condition. The information in only 46% of the posts was found to be verified and authentic whereas as much as 49.33% of the published posts originated from unverifiable sources. Misinformation regarding diabetes and its related management was depicted in 4.24% of the posts. According to studies by Petrovski et al., usage of social media allows people to gain a better understanding of their disease condition, as in the case of diabetes.¹⁰ However, people are more likely to share misinformation when it aligns with their existing beliefs.¹⁰ Thus, it is essential to correct this misinformation beforehand.

The findings of the study also revealed that the most common themes among these posts, on diabetes and its management, were related to diet (87 posts, 19.41%) and fitness and lifestyle changes associated with diabetes (28 posts, 6.20%). Personal experiences with diabetes (37 posts, 8.20%) and support for others living with the disease (21 posts, 4.68%) included personal suggestions and recommendations for managing diabetes, such as incorporating more physical activity into daily life and regularly monitoring blood sugar levels.

One interesting finding was that almost 20 posts (4.46%) discussed the use of alternative therapies and

natural remedies for managing diabetes. This suggests that some individuals may be turning to these methods as an alternative to traditional medical treatments.

7. Limitations

The present study had some limitations associated with it. Firstly, the study duration was only a week, which is a shorter duration of time. This allowed us to look at a relatively smaller sample size for the study. The study data was collected from various posts in languages that were analysed either English or Hindi, which limited our understanding of posts from other languages and the information promoted through them.

Another limitation was the absence of generalisability in this study. Instagram is an ever-evolving platform where new posts are added incessantly, resulting in a different set of compiled data every minute. Another limitation of our study is the spillover effect, resulting in an inability to identify the exact level of audience interaction of each of these posts. Sharing these posts with a wider audience and spreading information in these posts using other social media platforms may result in a larger circle of reception, that is not accurately depicted by the number of likes and comments on each of these posts.

8. Conclusion

Through our study, we found that when it comes to social media platforms such as Instagram, accessibility to the right information about diabetes is relatively difficult. Instagram is an ever-evolving platform where the continuous incorporation of recent knowledge and advice regarding chronic diseases such as diabetes would be beneficial to a wide audience. Content in the form of more videos could be created to bring about behavioural changes in the target audience. Representing the information in a meme or a cartoon would create a higher chance of the audience remembering the said information.

Qualified healthcare professionals should try to share more significant information that would enlighten diabetic patients and other users. Gabbon et al. promote social media usage while considering interventions by healthcare professionals and public healthcare systems.⁸ They should try to create more content on educating the users on diabetes management, including diet and treatment. Education about the disease diabetes, with its symptoms, prevalence, aetiology, prevention, management and treatment should be given a higher priority when putting out information about diabetes.

It was also noted that the level of interaction for posts that presented factual details was much lesser when compared to non-factual posts. Focusing on the readability of the content will in turn enhance the public accessibility of information.¹² This requires a better thought process and

innovation to put these messages forward so that they resonate with the values and ideals of the target audience. Apart from this, disease education through the language, especially the mother tongue, of the target audience will result in a wider audience participation as rightly put by Elgersma et al.⁷

Thus, our analysis of Instagram posts about diabetes provides valuable insights into how individuals discuss and manage the disease on social media. Further research could include analysing a larger sample of posts and exploring other social media platforms to better understand the diabetes conversation on social media.

In conclusion, social media platforms are beneficial to promote public health, if used in the right manner. The information circulated on social media should be verified before promotion and implementation, otherwise, they pose a risk to the community. It's always advisable to follow the guidelines issued by credible organisations such as the World Health Organisation and other professional societies to find the credibility of the information on social media platforms.


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