Original Article

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Impact of Social Media's Medical Misinformation about Diabetes Mellitus on Patient's Behaviour: A Cross-sectional Study

Internal Medicine Section

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ABSTRACT

Introduction: Social media serves as a key source of health information, shaping public perceptions and behaviours. However, the spread of misinformation, particularly regarding diabetes management, has influenced treatment decisions and self-care practices. The present study explores the impact of social media-driven misinformation on individuals with diabetes.

Aim: To assess how social media influences diabetes-related beliefs, the prevalence of misinformation, and its effect on adherence to evidence-based treatment.

Materials and Methods: The present cross-sectional study was conducted among 300 participants with diabetes at SRM Medical College and Research Institute, Chennai, Tamil Nadu, India, from January 2024 to June 2024. Data were collected using a structured questionnaire covering demographics, social media usage, diabetes-related beliefs, and trust in treatment options. Descriptive and inferential statistical analyses were performed to evaluate the impact of misinformation on disease management. A p-value<0.05 was considered statistically significant.

Results: The present study found that 183 participants (61%) spent over two hours daily on social media, increasing their exposure to both accurate and misleading health content. Around 131 participants (43.7%) believed diabetes-related claims based on high engagement metrics, while 77 (25.7%) endorsed unverified traditional remedies such as black cumin and *Senna auriculata*. Notably, 165 participants (55%) were "very likely" to follow advice from social media videos, and 56 (18.7%) expressed a willingness to discontinue prescribed medications in favour of alternative remedies. Misinformation was prevalent, with 154 participants (51.3%) believing that insulin is harmful and 161 (53.7%) thinking that the spleen regulates blood sugar. Despite this, 140 participants (46.7%) acknowledged the effectiveness of allopathic treatment, though skepticism remained regarding medication safety and regulatory processes.

Conclusion: Social media significantly influences diabetes management, with misinformation leading to altered treatment decisions and reliance on unverified remedies. Targeted public health interventions, improved patient education, and regulatory oversight are essential to counteract misinformation. Strengthening patient-provider communication is critical to ensuring adherence to evidence-based diabetes care. Future research should explore effective strategies to mitigate misinformation and enhance trust in scientifically validated treatments.

Keywords: Alternative therapies, Health literacy, Medication adherence, Self-care practices, Social media platforms

INTRODUCTION

The widespread use of social media has significantly altered people's access to and sharing of health information. The global expansion of internet usage has greatly enhanced access to health information, while advances in digital technologies have accelerated its distribution. According to recent statistics, approximately 72% of Americans are active on social media, with many turning to these platforms for health-related content [1]. In early 2023, about 67.5% of internet users in India were using at least one social media platform. This high percentage reflects the widespread presence of social media in the country, with YouTube, in particular, noted for its extensive user reach. Other platforms, such as Facebook and Instagram, also maintained substantial user bases, highlighting their role in digital engagement strategies for businesses and marketers within India [2].

Social media has become an essential medium for exchanging medical knowledge, health advice, and support related to disease management. In 2019, nearly 41% of United States internet users watched health-related videos on YouTube, while 17% shared health information on social networks [3]. However, alongside these benefits, the internet has also facilitated the rapid spread of false and misleading health information. The consequences of this spread are particularly concerning, as they can deepen existing health disparities and pose significant challenges for healthcare practitioners. Health professionals are increasingly faced with the task of addressing health misinformation when communicating with patients who have been influenced by incorrect information found online.

Health misinformation, which refers to information that is false, misleading, or inaccurate based on the best available evidence, presents a growing public health threat [4]. Social media can accelerate the spread of such misinformation, with platform algorithms often prioritising content that triggers emotional responses over factual content [5]. This dynamic is particularly dangerous during public health emergencies, where misinformation can influence critical behaviours such as vaccine hesitancy and delays in seeking medical care [6].

While there is extensive research on the prevalence of misinformation on social media, little attention has been given to how individuals perceive this misinformation and how these perceptions influence their health behaviours. Surveys show that a significant proportion of social media users believe much of the content they encounter is unreliable or inaccurate, yet how this perception impacts their actions-such as fact-checking or modifying health-related decisions-remains unclear [7]. One of the major risks is the vulnerability of typical social media users, who may lack the health and digital literacy skills needed to critically assess online content.

Some perspectives suggest that social media users are passive recipients of misinformation, easily influenced, and that the provision of authoritative, factual information will be sufficient to correct the problem. Despite the growing body of evidence about the presence of misinformation online, much less is known about how users interact with such content, why they may believe it, and which factors contribute to its consumption and endorsement [8,9].

Misinformation about diabetes, including false claims about home remedies and alternative treatments, can pose significant risks for individuals managing the condition. By analysing how individuals interpret and respond to diabetes-related misinformation on social media, the present study seeks to expand understanding of the relationship between misinformation, social media, and health behaviours. Therefore, the current study aimed to analyse the influence of medical misinformation on social media regarding diabetes mellitus on participants' mindsets and their behaviour in health-related decision-making.

Aim:

- To assess the extent of medical misinformation about diabetes mellitus among patients.
- To assess the impact of such medical misinformation on patients' health-related decision-making.

MATERIALS AND METHODS

The present cross-sectional study was carried out at SRM Medical College and Research Institute, Tamil Nadu, India, from January 2024 to June 2024. Ethical clearance was obtained from SRMIEC (No:ST12-11271). Informed consent was obtained from all participants.

Inclusion criteria: Participants who were 18 years or older, had a known diagnosis of diabetes, and engaged with social media for at least one hour daily.

Exclusion criteria: Healthcare professionals (doctors, nurses, paramedical staff), individuals under 18 years, and those with inadequate social media engagement (less than one hour per day).

Sample size calculation: The formula used for calculation was-

$$n \geq \frac{Z_{1-\frac{\alpha}{2}}^{2} p(1-p)}{d^2}$$

Where, p is the expected proportion or prevalence of the event of interest for the study.

'd' is the absolute precision

$Z_{1-\frac{\alpha}{2}}$ is normal deviate at a level of significance

To ensure relevance to the population, the authors conducted a pilot study with 30 participants at our institution, which found that 87.1% of respondents perceived benefits from social media content related to diabetes. Using this prevalence (p=0.871), with a 95% confidence level and 4% absolute precision, the minimum required sample size was estimated to be 264. To accommodate potential non responses, we enrolled 300 participants in the final study.

Study Procedure

The questionnaire items were developed by analysing popular YouTube videos related to diabetes management, selected based on their high view counts within the target population. This approach ensured that the questions reflected commonly encountered information and misconceptions disseminated through social media platforms with significant public engagement. The questionnaire was initially developed by a panel led by a Professor of Medicine with over 20 years of clinical experience in diabetes management. It was subsequently ratified for content validity by a panel comprising the Head of the Department, a certified Diabetologist, and three Professors of Medicine, two of whom hold fellowship training in Endocrinology. Additionally, face validity was assessed by pretesting the questionnaire on a small sample of participants to confirm clarity and relevance of the questions. While formal reliability testing, such as internal consistency analysis, was not performed, the questionnaire benefited from thorough expert validation and pilot testing, ensuring its clarity, relevance, and practical reliability within the target population. The questionnaire is available in [Annexure 1].

STATISTICAL ANALYSIS

Descriptive statistics, such as frequency and percentage, were calculated to summarise the categorical variables. Statistical Package for the Social Sciences (SPSS) version 29 was used for data analysis. A p-value less than 0.05 was considered statistically significant.

RESULTS

The convenience sample of 300 diabetic patients was included in this study. Nearly 114 (38%) patients were between 40-50 years of age, and 106 (35.3%) were between 50-60 years. There were 108 (36%) females and 192 (64%) males. Of the patients, 117 (39%) had diabetes for less than five years, while 74 (24.7%) had the disease for more than 15 years. A total of 183 (61%) patients used social media for more than two hours daily [Table/Fig-1].

Demographic characteristics		Frequency (%)
Age (years)	<30	5 (1.7%)
	30-40	17 (5.7%)
	41-50	114 (38%)
	51-60	106 (35.3%)
	>60	58 (19.3%)
Gender	Female	108 (36%)
	Male	192 (64%)
Duration of DM	<5 years	117 (39%)
	5-10 years	58 (19.3%)
	10-15 years	51 (17%)
	15-20 years	74 (24.7%)
Social media usage time	<1 h	4 (1.3%)
	1-2 h	113 (37.7%)
	>2 h	183 (61%)

[Table/Fig-1]: Demographic characteristics of study participants.

Home remedies and diabetes: Of the participants, 180 (61%) reported that Avaram Poo (*Senna auriculata*) lowers blood sugar levels, while 183 (61%) believed that including white sugar alternatives (Nattu sakkarai-raw sugar, Karupatti-palm jaggery) helps in controlling diabetes. About 173 (57.7%) participants believed that adding lemon juice to their diet helped reduce food intake, thereby aiding in diabetes control. 118 participants (39.3%) believed goat milk treats diabetes, while 170 (56.7%) believed Karunjeeragam (Black cumin) helps in controlling diabetes. Additionally, 29.7% of participants thought Sakkaravalli Kilangu (sweet potato) regulates insulin levels. A total of 197 participants (65.7%) believed that splitting meals into smaller portions was beneficial for diabetic patients [Table/Fig-2].

Regarding beliefs about physiology and treatment, 161 participants (53.7%) believed the spleen regulates diabetes, while 154 (51.3%) thought insulin administration is harmful. About 68.3% believed that improper digestion causes diabetes. Furthermore, 172 participants (57.3%) indicated that if their blood sugar levels exceeded 500 mg/dL, they would seek medical assistance immediately [Table/Fig-3]. Over half of the participants believed that uncontrolled sugar levels lead to kidney failure. A total of 126 (42%) participants believed that diabetic medications

are developed after thorough research and must pass numerous government-mandated safety regulations before being made available to the public [Table/Fig-4].

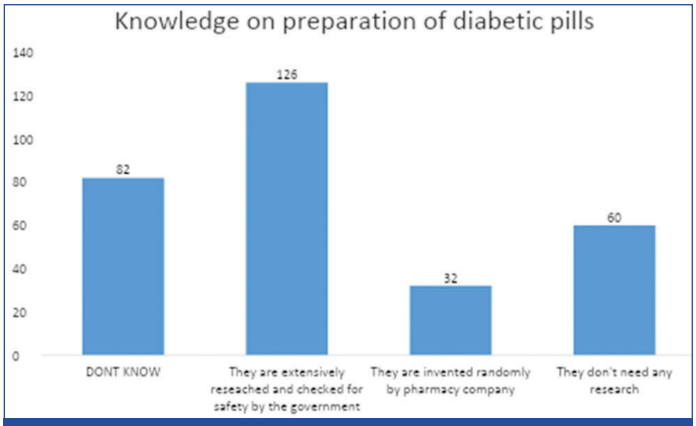
Variables		Frequency (%)
Belief in "Avaram Poo (*Senna auriculata*)" for lowering blood sugar levels	Don't Know	73 (24.3%)
	No	47 (15.7%)
	Yes	180 (60%)
Adding lemon juice, nattu-sakkarai and karupatti helps in controlling blood sugar	Don't Know	38 (1271%)
	No	79 (26.3%)
	Yes	183 (61%)
Adding lemon juice will reduce your food intake	Don't Know	57 (19%)
	No	70 (23.3%)
	Yes	173 (57.7%)
Karunjeeragam (black cumin) has a role in controlling diabetes	Don't Know	24 (8%)
	Maybe	20 (6.7%)
	No	86 (28.7%)
	Yes	170 (56.7%)
Efficacy of eating Karunjeeragam (black cumin) for 48 days in curing diabetes	Don't Know	15 (5.3%)
	Maybe	87 (29%)
	No	74 (24.7%)
	Yes	124 (41%)
Role of Goat milk in curing diabetes	Don't Know	83 (27.7%)
	May Be	12 (4%)
	No	87 (29%)
	Yes	118 (39.3%)
Sakkaravalli Kilangu (sweet potato) helps in insulin regulation	Don't Know	82 (27.3%)
	No	129 (43%)
	Yes	89 (29.7%)
Opinion on splitting meals into small portions for diabetic patients	Correct	197 (65.7%)
	Don't Know	35 (11.7%)
	Wrong	68 (22.6%)

[Table/Fig-2]: Belief of study participants on home remedies for treating diabetes.

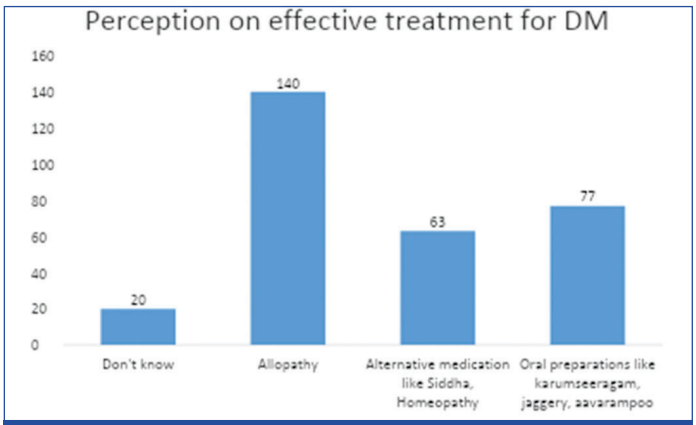
Variables		Frequency (%)
Administration of insulin is harmful	Don't know	92 (30.6%)
	No	54 (18%)
	Yes	154 (51.3%)
Spleen has a role in diabetes control	Don't know	75 (25%)
	No	64 (21.3%)
	Yes	161 (53.7%)
Belief in detoxing the spleen to cure mouth ulcers and improve sugar control	Don't know	58 (19.3%)
	No	96 (32%)
	Yes	146 (48.7%)
Diabetes caused due to improper digestion of food	No	95 (31.7%)
	Yes	205 (68.3%)
Actions if blood sugar levels are above 500 mg/dL	I will seek medical attention	172 (57.3%)
	I will start consuming herb juice like aavarampoo etc.,	88 (29.3%)
	Others	40 (13.3%)
Common cause of renal failure in Diabetic patients	As a result of uncontrolled sugars	196 (65.3%)
	Due to anti-diabetic medications	104 (34.7%)

[Table/Fig-3]: Perceptions of study participants about diabetes management.

Regarding treatment preferences, 140 participants (46.7%) believed that allopathic treatments were effective for diabetes, while 77 (25.7%) believed that oral preparations such as Karunjeeragam (Black cumin), Avaram Poo (*Senna auriculata*), and palm jaggery were effective [Table/Fig-5]. A total of 131 participants (43.7%) reported believing health-related stories if they had over a million views [Table/Fig-6].



[Table/Fig-4]: Knowledge on preparation of diabetic pills.



[Table/Fig-5]: Perception on effective treatment for Diabetes.

Belief in random stories of diabetes cures	Frequency (%)
Don't know	35 (11.7%)
Believe it, if it has more than million views	131 (43.7%)
Don't believe it	57 (19%)
Less likely to be true	69 (23%)
Maybe	8 (2.7%)

[Table/Fig-6]: Belief of study participants in random stories of diabetes cures as seen in social media.

A significant majority, 165 participants (55%), indicated that they were "very likely" to follow the instructions provided in social media content, while 78 participants (26%) were "likely" to follow them. Additionally, 43 participants (14.3%) responded with "maybe," and 14 participants (4.7%) stated they would "never" follow the instructions. Regarding implementation, the majority of participants (179 individuals, 59.7%) reported that they would use the video instructions as a supplement to their regular medication [Table/Fig-7].

Variables		Frequency	Percentage
Likely to follow instructions	Likely	78	26.0
	Maybe	43	14.3
	Never	14	4.7
	Very likely	165	55.0
Implementation of aforementioned	I will discontinue my medications completely and follow the alternative remedies	56	18.7
	I will substitute these things instead of regular medication	65	21.7
	I will use it as a supplementation to my regular medication	179	59.7

[Table/Fig-7]: Effectiveness of random social media video instructions.

DISCUSSION

The study sample predominantly comprised individuals aged 40-60, a group often facing the onset of chronic conditions such as diabetes. Notably, 61% of participants reported using social media for over two hours daily, exposing them to both verified and misleading health content. Platforms such as Facebook, Instagram, and YouTube provide information on diabetes; however, as Suarez-Lledo V and Alvarez-Galvez J note, much of this content lacks verification, highlighting the need for improved appraisal skills and regulatory oversight [10].

Establishing a centralised authority of health experts and publicly accessible portals could help mitigate misinformation. Social media serves a dual role-empowering patient engagement while enabling the rapid dissemination of health myths [3]. Many participants believed in unverified remedies, such as certain herbs and foods affecting blood sugar, which are often shared online [10]. Chou WS et al., warn that such misinformation compromises patient care and encourages reliance on alternatives over prescribed treatments [4].

In this study, 60% of participants believed that *Senna auriculata* could lower blood sugar, and 42.8% trusted "miracle cure" videos [4,9,11]. These trends highlight a preference for quick fixes over evidence-based care. Wang Y et al., similarly reported high usage of alternative medicine among Indonesian diabetic patients, although efficacy often lacks scientific validation [12,13].

Alarmingly, 53.7% of participants believed the spleen regulates diabetes, and 51.3% viewed insulin as harmful. These notions likely stem from misinformation and limited doctor-patient communication [1]. Raghavendran S et al., reported financial concerns, fear of pain, and dependency as primary reasons for insulin refusal, factors that compound the effects of misinformation [14].

Although 65.3% of participants knew that diabetes could lead to kidney failure, this awareness did not consistently prompt proactive behaviour, echoing the study's findings that beliefs and barriers shape health decisions [15]. While 57.3% acknowledged the need for medical assistance when blood sugar exceeds 500 mg/dL, many still turned to traditional remedies, delaying urgent care [6]. Additionally, 68.3% attributed diabetes to digestive issues, revealing gaps in biological understanding and highlighting the need for accurate education [13].

Despite these misconceptions, 46.7% affirmed the effectiveness of allopathic medicine. However, only 42% believed that diabetes drugs undergo thorough testing, indicating trust issues [16]. Strengthening transparency in regulation could improve treatment confidence and health outcomes [17].

Similar to findings among Japanese diabetic patients, who perceive diabetes through cultural lenses (e.g., "dry" vs. "wet" types) [12], our participants held diverse misconceptions that impacted care. Social media's amplification of such beliefs underscores the urgent need for targeted digital literacy initiatives and health campaigns.

Finally, 55.0% of participants were "very likely" and 26.0% "likely" to follow video-based advice, highlighting the appeal of simplified, popular content. Though 59.7% intended to combine such advice with medical care, 21.7% considered replacing their prescriptions, and 18.7% contemplated abandoning treatment entirely-raising serious concerns about the reach and influence of misinformation.

Diabetes requires a careful and regulated treatment plan, as improper management can lead to severe complications, including cardiovascular disease, neuropathy, nephropathy, and retinopathy. The willingness of these participants to abandon medically prescribed regimens in favour of unvetted social media advice reflects a gap in health literacy and an overreliance on the perceived simplicity and allure of alternative treatments.

Limitation(s)

The present study's cross-sectional design limits causal inference. Self-reported data may be subject to recall and social desirability biases. While the questionnaire underwent expert validation and pilot testing, formal psychometric testing (e.g., internal consistency analysis) was not conducted. A small subset of participants (1.3%) reported slightly less than one hour of daily social media use but were included to preserve the sample size; sensitivity analysis excluding them did not alter the results. Additionally, the single-center design and unmeasured factors such as health literacy and socioeconomic status may limit generalisability.

CONCLUSION(S)

Many patients are drawn to alternatives to allopathy due to the promise of a cure and the perception that these treatments are free of side effects. This appeal is amplified by the unchecked spread of misinformation on social media, which often overshadows evidence-based guidance. To address this, a centrally regulated, Artificial Intelligence (AI)-driven medical information platform accessible to all citizens should be established to provide reliable, up-to-date disease information and counteract misleading health narratives. Such an initiative is essential to strengthen public trust in scientific care and promote informed decision-making.

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