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Saudi Diabetic Patients' Beliefs and Experiences with Health Related Information from Social Media

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Author's contribution

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Introduction: Social media and acceptance of the information related to health is becoming acceptable to an extent for the public. The use of social media is rapidly growing and it is being used both by healthcare professionals and patients. The aim of this study was to evaluate the use of social networking applications for experience and behaviour towards health information among diabetic patients.
Materials and Methods: The present study was a cross sectional study, conducted in spring of 2020 (April to May). The distribution of the survey questionnaire was done online through various social media platforms with a convenience sample of people with diabetes (n=569), Eligibility criteria were aged 18 and above, Saudis with diagnosis of diabetes and willing to give consent were included in the study. Exclusion criteria were less than 18 years old and non-Saudis and non-diabetic.
Results: Analysis of online survey data indicated that WhatsApp (89.1%) was the most commonly used social network followed by Snapchat (66.3%), Instagram (40.6%), Twitter (35%), Telegram (19.5%), Tiktok (12.5%) and Facebook (10%). About 25 (4.4%) participants strongly agreed that health information from social media impact life positively. More than half 290(51%) participants agreed to apply information only from the trusted websites. Near about half 275(48.3%) disagreed that social media could invent treatment for diabetes more than believing in health institution and

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medicinal industries. Nearly one-fourth 141(24.8%) of participants agreed that all health information from social media is right. Almost 264 (46.4%) said that they sometimes face health information in social media. Nearly 265(46.6%) patients mentioned that they never applied themselves any information claiming treating diabetes.

Conclusion: This study shows the effect of social media on diabetic patients and various responses of diabetic patients in regard of their beliefs and experience towards health information from social media. Most of the respondents agreed that they apply information obtained from social network and the same could lead to some deleterious effects on health.

Keywords: Beliefs; diabetes; health information; social media.

1. INTRODUCTION

Diabetes mellitus is one of the most common chronic diseases in the whole world, especially in the Middle East [1]. According to International Diabetes Federation (IDF), Saudi Arabia ranks fourth in the prevalence of diabetes in the Middle East and North Africa (MENA) [2].

Diabetes can be classified into the following general categories: Type 1 diabetes (due to β-cell destruction in pancreas, usually leading to absolute insulin deficiency) and Type 2 diabetes (due to a progressive insulin secretory defect on the background of insulin resistance) [3].

Many factors can cause diabetes mellitus like: Family history, Physical inactivity, High blood pressure, most of the causal factors are related to behavioural change, for example eating habits and exercise namely [4].

Approximately 463 million adults (20-79 years) will be diabetics by 2045 and this will rise to 700 million. In 2019, approximately 54.8 million adults aged 20–79years, or 12.8% of the MENA population (Middle East and North Africa) in this age group, have diabetes. Diabetes and its complications were mainly responsible for an estimated 418,900 deaths among adults aged 20–79 years. Saudi Arabia has 4,275,200 cases in 2019. Diabetes caused at least USD 760 billion dollars in health expenditure in 2019 which is 10% of total spending on adults [4].

In 2019, diabetes-related health expenditure in the MENA Region totalled USD 24.9 billion and expected to increase by 30.3% to USD 32.5 billion by 2030. It is estimated that more than 1.1 million children and adolescents are living with type 1 diabetes. Also more than 20 million live births (1 in 6 births) are affected by diabetes during pregnancy and around 374 million people are at increased risk of developing type 2 diabetes [4].

The use of social media such as YouTube, Twitter and Facebook are rapidly growing. Facebook alone has over 800 million active users [5]. People are using online resources for health purposes for example seeking advice, connecting with individuals with the same experiences, sharing questions and concerns about treatment options, or understanding professional diagnoses.

With the wide spread use of the Internet and its relatively inexpensive bandwidth, social media, and specifically social net-working sites, are beginning to be more utilized by both healthcare professionals and patients [6].

Social networking can be useful in many areas and play an important role in sharing information and knowledge. It can be used in managing chronic diseases like diabetes when there is an immediate need to raise awareness of various behavioural aspects of healthy diet, physical exercise and knowledge of self-management [6]. People can be educated and their awareness levels can be increased through information sharing and discussions via mobile social media applications, which are very convenient and easy to use. This can rapidly decrease healthcare expenditures in managing such chronic diseases and help people to self-manage their disease effectively [7].

Since the data regarding the same in paucity in Saudi Arabia Region which could explore the potential benefits and harms of the social networking platforms, hence the aim of this study was to evaluate the use of social networking applications for the experiences, behaviour of Saudi diabetic patients toward health information from social media; overuse of social media and wide spread of health information including fake or misleading material.

2. MATERIALS AND METHODS

Information regarding diabetes mellitus was collected through online survey. As part of the survey, participants were asked to answer questions broadly classified as: demographic

information; educational level; the social media platforms used; to what extent diabetes is controlled; they believe in the importance of social media; How many times did you apply it on yourself the information claiming treating diabetes; Participation was anonymous and inclusion criteria required patients to be at least 18 years old and to be Saudis and diabetics. An exclusion criterion is less than 18 years old, non-Saudis and non-diabetics. No compensation was offered for participation. The study was approved by the Institutional Review Boards of the participating institutions. Firstly, we did a pilot study on 10 patients, then after validation the link of survey was distributed in Arabic language through the various social media platforms: Tiktok, Instagram, Snapchat, Telegram, WhatsApp, Twitter, Facebook among Saudi participants. We also asked about clarity of the questionnaire and nobody reported any problem in the language and the content. Secondly, participants had to agree that they are Saudis, diabetics and willingly agree to fill the survey then redirected to the survey, if answer were No the survey will closed automatically.

2.1 Statistical Analysis

All the responses were coded and entered into the statistical package for social sciences SPSS (IBM-SPSS version 25, Armonk, NY) and analysis was performed. A descriptive statistics of frequency distribution and percentages were calculated for the characteristics of the study participants. Chi-Square test was applied to know relationship between use of social media application and demographic factors and diabetic type. A p value below ($p<0.05$) was considered significant for all the statistical purposes.

3. RESULTS

A total of 569 diabetic patients responded to the questionnaire items. More than one fourth of the patients were aged 45-54 years. More than half 326 (57.3%) of the participants were females while 243 (42.7%) males responded to the questionnaires. High percentage 188 (33%) of the participants had university level of education. Majority of the participants were having type 2 diabetes 344 (60.5%), followed by type 1 diabetes 207(36.4%) and gestational diabetes 18(3.2%). Most of the patients fairly 380 (66.8%) controlled their diabetic condition, as shown in (Table 1).

Fig. 1 displays the social media network used by the study participants. WhatsApp (89.1%) was the most commonly used social network followed by Snapchat (66.3%), Instagram (40.6%), Twitter (35%), Telegram (19.5%), Tiktok (12.5%) and Facebook (10%).

Table 1. Characteristics of the study participants (n=569)

Characteristics		n	%
Age (in Years)	18-24	49	8.6%
	25-34	92	16.2%
	35-44	140	24.6%
	45-54	146	25.7%
	55-64	98	17.2%
	Above 65	44	7.7%
Sex	Male	243	42.7%
	Female	326	57.3%
Education	No formal education	72	12.7%
	Primary school	55	9.7%
	Intermediate school	70	12.3%
	Secondary school	184	32.3%
	University	188	33.0%
Diabetic type	Type 1 DM	207	36.4%
	Type 2 DM	344	60.5%
	Gestational DM	18	3.2%
How well controlled is your diabetic status	Excellent	93	16.3%
	Fair	380	66.8%
	Poor	96	16.9%

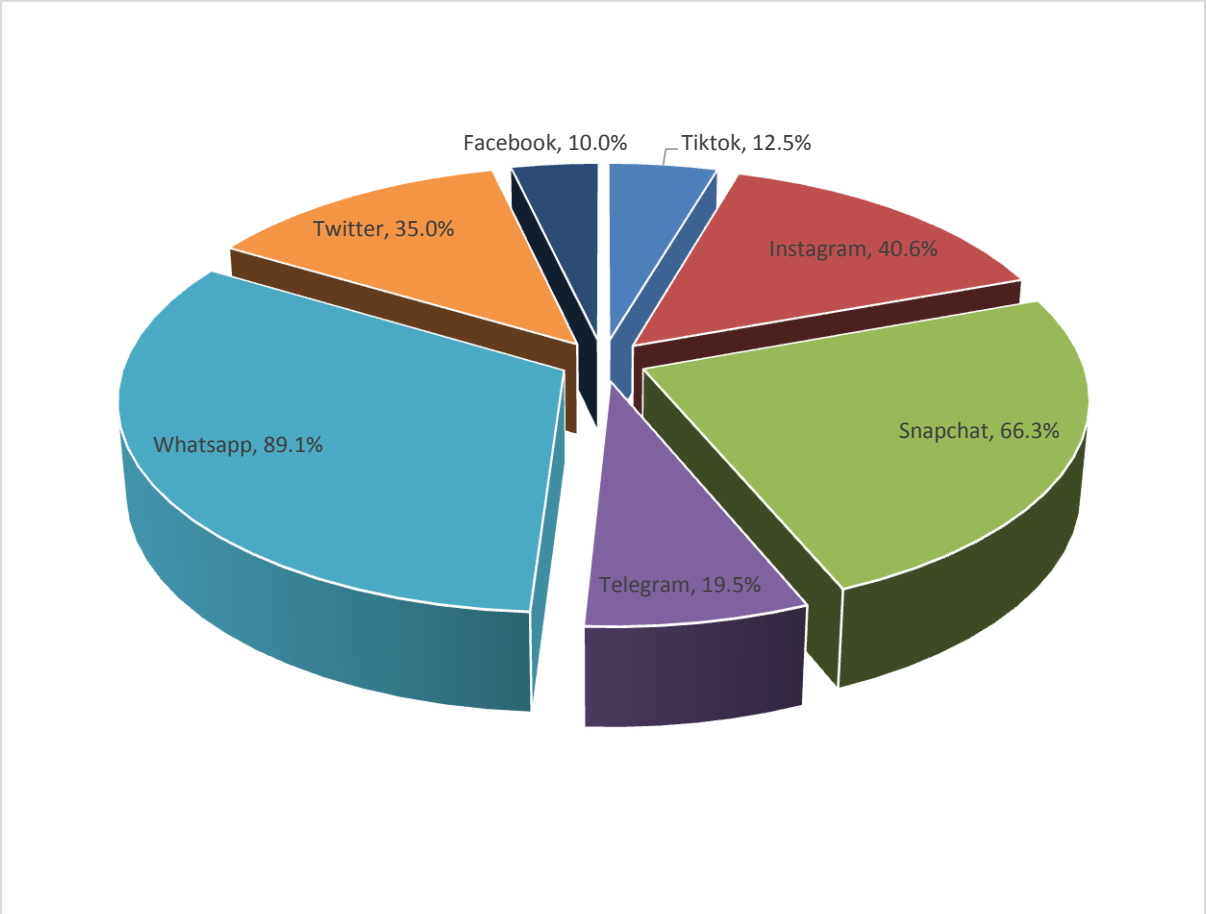

Fig. 1. Social Media networking used by the study participants

Table 2. Use of diabetic information among study participants (n=569)

Questionnaire Items	Always	Often	Sometimes	Rarely	Never
You visit diabetic clinic	155 27.2%	101 17.8%	166 29.2%	123 21.6%	24 4.2%
How many times did you apply on yourself that information claiming treating diabetes?	16 2.8%	17 3.0%	117 20.6%	154 27.1%	265 46.6%
How many times you forward to others any information claiming treating diabetes?	20 3.5%	19 3.3%	104 18.3%	148 26.0%	278 48.9%
How often you face health information in social media?	87 15.3%	79 13.9%	264 46.4%	101 17.8%	38 6.7%
How frequently you use social media to communicate your physician?	24 4.2%	21 3.7%	114 20.0%	156 27.4%	254 44.6%

Fig. 2. Belief of study participants in importance of social media in health information

Use of diabetic information among the study participants is displayed in (Table 1). A total of 155 (27.2%) patients always visited diabetic clinic. Nearly 265 (46.6%) patients mentioned that they never apply any information on themselves claiming treating diabetes. While 278 (48.9%) mentioned that they never forward to others any information claiming treating diabetes. Almost 264 (46.4%) said that they sometimes face health information in social media. Only 24(4.2%) patients use social media to communicate physician.

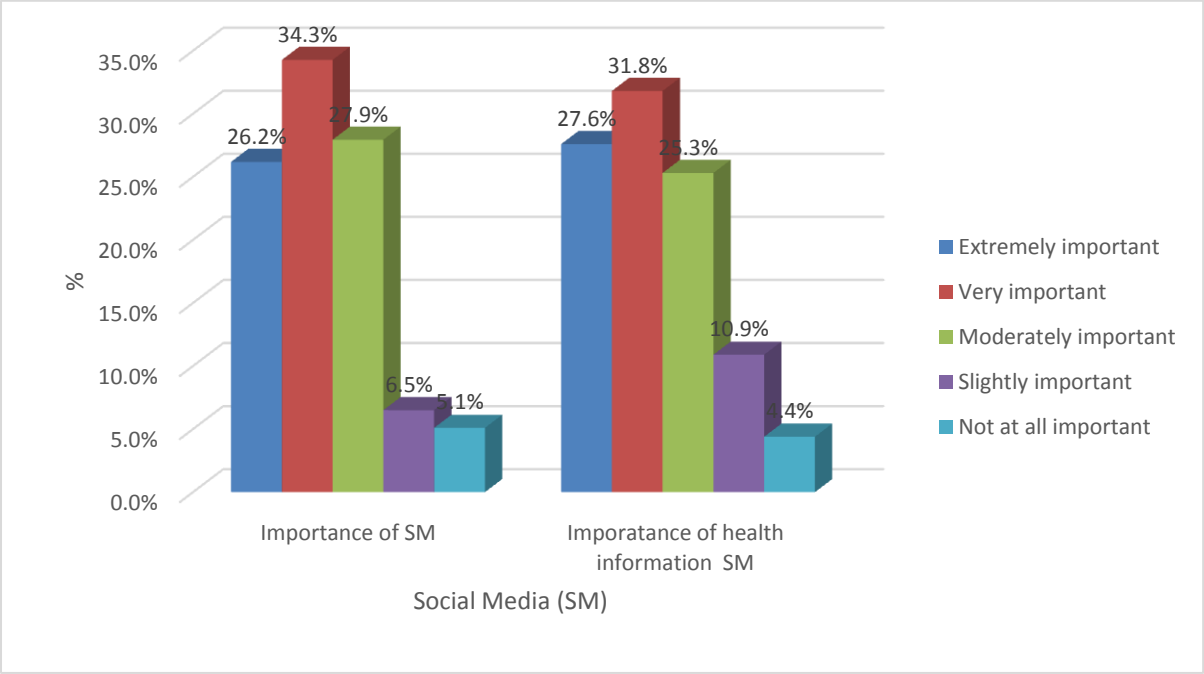

Table 3. Attitude towards Health information and diabetic treatment

Questionnaire Items	SA	A	N	D	SD
All Health information from social media is right?	50 8.8%	141 24.8%	197 34.6%	152 26.7%	29 5.1%
Do you believe in any information claiming treating diabetes?	16 2.8%	37 6.5%	141 24.8%	269 47.3%	106 18.6%
Do you feel more convinced if the introducer of that information claiming treating diabetes was religious?	14 2.5%	76 13.4%	147 25.8%	220 38.7%	112 19.7%
Do you think health information from social media impact your life in positive way?	25 4.4%	112 19.7%	197 34.6%	191 33.6%	44 7.7%
Are you keen to Apply only information that's from trusted websites?	112 19.7%	290 51.0%	89 15.6%	61 10.7%	17 3.0%
Do You believe in social media could come up with treating for diabetes more than believing in health institution and medicine companies?	26 4.6%	48 8.4%	112 19.7%	275 48.3%	108 19.0%
If the information that claiming treating diabetes is to get treated in a particular country, would you agree to travel to that country?	66 11.6%	124 21.8%	94 16.5%	196 34.4%	89 15.6%

SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree, SD=Strongly Disagree

About 34.3% of the participants believed that the social media is very important in day to day life, while 31.8% believed that the social medial is very important in sharing health information (Fig. 2).

Nearly one-fourth 141(24.8%) of the participants agreed that all Health information from social media is right. Only 16 (2.8%) strongly agreed to believe in any information claiming treating diabetes. Only 14(2.5%) patients strongly agreed to information claiming treating diabetes was religious. About 25 (4.4%) participants strongly agreed that health information from social media impact life positively. More than half 290(51%) participants agreed to apply information only from the trusted websites. Near about half 275(48.3%) disagreed that social media could come up with treating for diabetes more than believing in health institution and medicine companies. Almost 66 (11.6%) strongly agreed to travel to other country claiming treatment for diabetes. The attitude towards health information and diabetic treatment are displayed in (Table 3).

Table 4. Use of Social media and demographic factors and diabetic type

Social media network		Age						Gender		Education					Diabetic type		
		18-24	25-34	35-44	45-54	55-64	> 65	Male	Female	NFE	P	I	S	U	Type-1	Type-2	Gestational
Tiktok	No	87.8%	75.0%	85.7%	93.2%	89.8%	95.5%	85.2%	89.3%	91.7%	94.5%	85.7%	87.0%	85.1%	86.0%	88.7%	83.3%
	Yes	12.2%	25.0%	14.3%	6.8%	10.2%	4.5%	14.8%	10.7%	8.3%	5.5%	14.3%	13.0%	14.9%	14.0%	11.3%	16.7%
	p	.001*						.145		.299					.564		
Instagram	No	44.9%	41.3%	55.7%	58.2%	77.6%	88.6%	67.1%	53.7%	91.7%	83.6%	64.3%	55.4%	42.0%	59.9%	59.6%	50.0%
	Yes	55.1%	58.7%	44.3%	41.8%	22.4%	11.4%	32.9%	46.3%	8.3%	16.4%	35.7%	44.6%	58.0%	40.1%	40.4%	50.0%
	p	<0.001						.001*		<0.001					.709		
Snapchat	No	28.6%	6.5%	22.9%	36.3%	57.1%	70.5%	39.5%	29.4%	75.0%	54.5%	41.4%	25.5%	17.0%	33.8%	34.0%	27.8%
	Yes	71.4%	93.5%	77.1%	63.7%	42.9%	29.5%	60.5%	70.6%	25.0%	45.5%	58.6%	74.5%	83.0%	66.2%	66.0%	72.2%
	p	<0.001						.012*		<0.001					.862		
Telegram	No	83.7%	69.6%	72.9%	83.6%	89.8%	93.2%	76.1%	83.7%	95.8%	92.7%	90.0%	76.1%	71.8%	81.2%	79.7%	88.9%
	Yes	16.3%	30.4%	27.1%	16.4%	10.2%	6.8%	23.9%	16.3%	4.2%	7.3%	10.0%	23.9%	28.2%	18.8%	20.3%	11.1%
	p	<0.001						.023*		<0.001					.600		
WhatsApp	No	16.3%	9.8%	12.9%	5.5%	12.2%	15.9%	7.4%	13.5%	13.9%	18.2%	14.3%	12.5%	4.8%	10.1%	10.8%	22.2%
	Yes	83.7%	90.2%	87.1%	94.5%	87.8%	84.1%	92.6%	86.5%	86.1%	81.8%	85.7%	87.5%	95.2%	89.9%	89.2%	77.8%
	p	.162						.021*		.016*					.286		
Twitter	No	63.3%	47.8%	54.3%	66.4%	83.7%	90.9%	56.4%	71.5%	93.1%	92.7%	82.9%	59.8%	44.7%	62.3%	66.6%	66.7%
	Yes	36.7%	52.2%	45.7%	33.6%	16.3%	9.1%	43.6%	28.5%	6.9%	7.3%	17.1%	40.2%	55.3%	37.7%	33.4%	33.3%
	p	<0.001						<0.001		<0.001					.592		
Facebook	No	95.9%	89.1%	88.6%	85.6%	92.9%	97.7%	84.4%	94.2%	94.4%	96.4%	92.9%	88.6%	86.7%	93.2%	87.5%	100.0%
	Yes	4.1%	10.9%	11.4%	14.4%	7.1%	2.3%	15.6%	5.8%	5.6%	3.6%	7.1%	11.4%	13.3%	6.8%	12.5%	0.0%
	p	.101						<0.001		.118					.034*		

*NFE=No Formal Education, P=Primary education, I=Intermediate education, S=Secondary education, U=University education, * Chi-square test*

Use of different social media platforms (yes/no) among diabetic patients and associated demographic differences are described in (Table 4). Tiktok use (Yes/No) was common among 25-34 year (25%) old followed by 35-44 years (14.3%), 18-24 (12.2%), 55-64 (10.2%), 45-54 (6.8%) and > 65 years (4.5%) old age groups. Chi-square test indicated a statistically significant difference in use of Tiktok (yes/no) among diabetic patients (p=0.001). On the contrary, gender (p=0.145), education (p=0.299) and diabetic status (p=0.564) of the study participants did not yield any significant differences.

When asked about the use of Instagram (yes/no), most of the patients in age group 25-34 (58.7%) responded positively, followed by 18-24 (55.1%), 35-44 (44.3%), 45-54 (41.8%), 55-64 (22.4%) and > 65 (11.4%). The use of Instagram across different age groups showed statistically significant differences (p<0.001). Similarly use of Instagram between male (32.9%) and female (46.3%) diabetic patients differed significantly (p=0.001). Also, use of Instagram differed significantly across various educational of diabetic patients (p<0.001). However, use of Instagram did not differ significantly across diabetic type (p=0.709).

Use of Snapchat was most common among 25-34 (93.5%) year age group`, followed by 35-44(77.1%), 18-24 (71.4%), 45-54 (63.7%), 55-64(42.9%) and > 65 years (29.5%) respectively. Use of Snapchat differed significantly among age groups (p<0.001). A significantly higher percentage of female (70.6%) diabetic patients compared to the male (60.5%) diabetic patients utilized Snapchat (p=0.012). A higher percentage of study participants with university education (83%), followed by secondary (74.5%), intermediate (58.6%) and primary (45.5%) and no formal education (25%) utilized the Snapchat. The use of Snapchat across different categories of education of diabetic patients showed statistically significant difference (p<0.001). However, no significant difference was observed in use of Snapchat among different type diabetic patients (p=0.862).

Telegram was found to be popular among 25-34 (30.4%) years age group, followed by 35-44 (27.1%), 45-54 (16.4%), 18-24 (16.3%), 55-64 (10.2%) and (6.8%) among> 65 years old. Further use of telegram across different age groups demonstrated significant differences (p<0.001). Similarly, higher proportion of male (23.9%) diabetic patients significantly more likely to use telegram compared to the female (16.3%) patients (p=0.023). A very higher percentage of University educated (28.2%) patients followed by secondary (23.9%), intermediate (10%), primary (7.3%) and No formal education (4.2%) subjects used Telegram. The use of telegram application differed significantly across various educational groups (p<0.001). However, no such statistically significant difference was evident across various diabetic types (p=0.600).

WhatsApp was the most popular social media platform observed across all the age groups of the study participants without any statistically significant differences (p=0.162). Use of WhatsApp was significantly higher among male (92.6%) compared to the female (86.5%) study participants (p=0.021). Similarly, WhatsApp use varied across different educational groups. A high proportion of study subjects with undergraduate education (95.2%), followed by secondary (87.5%), no formal education (86.1%), intermediate (85.7%) and primary (81.8%) educated utilized WhatsApp. The use of WhatsApp differed significantly across various educational categories of the study participants (p=0.016). However, use of WhatsApp did not show any significant difference across diabetic type (p=0.286).

Use of Twitter found to be highest 25-34 years old (52.2%), followed by 35-44 (45.7%), 18-24 (36.7%), 45-54 (33.6%), 55-64 (16.3%) and > 65 years (9.1%) age groups. The use of Twitter differed significantly across various age groups of the study participants (p<0.001). Similarly, high proportions of male (43.6%) participants more likely to use Twitter compared to the females (28.5%), and the difference was significant (p<0.001). When use of Twitter is compared across different educational categories, high percentage of study participants with undergraduate education (55.3%) used Twitter followed by secondary (40.2%), intermediate (17.1%), primary (7.3%) and no formal educational (6.9%) categories, and the difference was statistically significant (p<0.001). On the contrary, diabetic type did not show any significant differences in use of Twitter (p=0.592).

When enquired about the use of Facebook between male and female diabetic patients, significantly higher male (15.6%) patients tend to use Facebook compared to the female patients (5.8%) (p<0.001). While type 1 diabetic (6.8%), type 2 diabetic (12.5%) and none of the gestational diabetic used the Facebook. The use

of Facebook across different diabetic types showed statistically significant difference (p=0.034). However, age groups (p=0.101) and educational categories (p=0.118) of the study subjects did not show any significant difference in use of Facebook. Relation between social media and demographic factor is displayed in (Table 4).

4. DISCUSSION

Health information importance from social media is significant in Saudi community as the study depicts. The overall participants believed in importance of the social media and specifically here health information from social media which assure that social platforms are highly effective in delivering health messages and also indeed carrying a risk of misleading or fake information. Overall 65.3% of participants have either secondary or university education level which reflects that education level is impacting patients in positive way when using social media and is same according to the study reported by Alanzi, T et al. [8]. When participants asked about their beliefs in any information claiming to be treating diabetes, a small number of them agreed to believe any information in this regard but oppositely when they asked about travelling to particular country based on the claiming information the percentage of agreed on that and is significantly higher and the results were in concordance according the study done by Shaw R.J et al. [9]. Because of the religious background of Saudi society, they were asked about extent of belief in claiming information for treating if the introducer of it was a religious person, so approximately half of the patients either strongly agreed or agreed or neutral which gives a hint that using religion for delivering health information impacts patients in a way cannot be ignored, the results shown by AlQarni was in favour of the present study [10]. 72% of participants either rarely or never used social media to communicate with their health providers although they overall agree on the importance of the health information from social media, which raises a question of origin of this gap between patients and health care providers, the study was in accordance to the study done by Alanzi, T et al. [11]. Moreover it was also seen that, based on the available information the finding could be because of defects in methods of health care providers to reach and contact their patients on social media, the study done Nelakurthi A.R et al showed different results and were not in agreement with the present study [12]. More than 1 quarter of participants either always or often or sometimes apply on themselves that kind of information claiming treating DM which might predicts reason of occurring some complication DM patients especially if they were asked to stop their medication as advised by the alleged information, again the study results were not in concordance with the study and review done by Abedin, T et al and Chhabra KG et al. [13,14].

In the present research, the authors agreed with Mohammadi, H et al. [15] in using WhatsApp as an effective tool to improve diabetes knowledge and self-efficacy moreover because its heist usage among other social platforms.

Moreover, our finding matches the point mentioned in Fergie, G et al. [16] that higher number of posters targeting diabetic patients was between 40-60 years of age. In the present study, we recommend organized channels through social media between health care providers and patients. In a systematic review done by Abdelaziz Elnagga et al shown that use of internet was promising among diabetic patients [17].

Authors have reported that, raising the awareness toward alleged information in treating DM and Advise them to get the health information from health organization like ministry of health and official accounts for example such that found on twitter and find out reason of the gap between health care provider and patients in addition in social media. Another area for future research is on patients, and especially applying the alleged information claiming treating diabetes mellitus and specific its impact on complication on their health.

5. CONCLUSION

From the present it can be concluded that using health information through social media is very important as the study mentioned. Most of the participants received information from the social media about diabetes but not many applied to relieve the symptoms of the same. WhatsApp was the most common social media platform utilized by the participants to get the information. Most educated class in any age group uses more of sanpchat and Twitter. Males used more of facebook as compared to females. The risk of getting complication from believing information claiming treating DM was very much high. There is a clear gap in communication between patients and health care provider through social media.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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ANNEXURE

The Questionnaire

1. **Age**

   18-24
   25-34
   35-44
   45-54
   55-64
   Above 65

2. **Sex**

   MALE
   FEMALE

3. **Education**

   No formal education
   Primary school
   Intermediate school
   Secondary school
   University

4. **Diabetes Type:**

   Type 1 DM
   Type 2 DM
   Gestational DM

5. **Mark on Social Media networking that you use**

   Tiktok,
   Instagram,
   snapchat,
   Telegram,
   WhatsApp,
   Twitter,
   Facebook

6. **How well controlled is your diabetic status**

   Excellent
   Fair
   Poor

7. **You visit diabetic clinic**

   Always
   Often
   Sometimes
   Rarely
   Never

8. Your belief in importance of social media?

Extremely important
Very important
Moderately important
Slightly important
Not at all important

9. Your belief in importance of health information from social media

Extremely important
Very important
Moderately important
Slightly important
Not at all important

10. All Health information from social media is right?

Strongly agree
Agree
Neither agrees nor disagrees
Disagree
Strongly disagree

11. Do you believe in any information claiming treating diabetes?

Strongly approve
Approve
Neutral
Disapprove
Strongly disapprove

12. How many times did you apply on yourself that information claiming treating diabetes?

Always
Often
Sometimes
Rarely
Never

13. How many times you forward to others any information claiming treating diabetes?

Always
Often
Sometimes
Rarely
Never

14. Do you feel more convinced if the introducer of that information claiming treating diabetes was religious?

Strongly approve
Approve
Neutral
Disapprove
Strongly disapprove

15. Do you think health information from social media impact your life in positive way?

Strongly agree
Agree
Neither agrees nor disagrees
Disagree
Strongly disagree

16. Are you keen to apply only information that's from trusted websites?

Strongly agree
Agree
Neither agrees nor disagrees
Disagree
Strongly disagree

17. Do you believe in social medial could come up with treating for diabetes more than believing in health institution and medicine companies?

Strongly agree
Agree
Neither agrees nor disagrees
Disagree
Strongly disagree

18. If the information that claiming treating diabetes is to get treated in a particular country, would you agree to travel to that country?

Strongly agree
Agree
Neither agrees nor disagrees
Disagree
Strongly disagree

19. How often you face health information in social media?

Always
Often
Sometimes
Rarely
Never

20. How frequently you use social media to communicate your physician?

Always
Often
Sometimes
Rarely
Never

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