Factors Influencing Information Adoption from Social Media About COVID-19 by Saudi Citizens

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Abstract: Social networking sites comprise an open world where anyone can share different types of information. During the Covid-19 pandemic, people's social isolation made social media particularly important, and it has emerged as an important platform for sharing health information. The credibility of the information, however, is questionable. Therefore, this study aims to understand attitudes towards using social media as an information source among social media users in Saudi Arabia. Specifically, it seeks to examine the propensity of individuals towards using health information from social media platforms and whether individuals demographic factors (such as gender) impact information adoption. Based on using an online questionnaire incorporating a novel vignette design to measure participants' perceptions of information sources on social media platforms. The findings revealed that there is a high use of social media platforms among the Saudi population and that verified accounts on social media platforms, same gender and nationality positively affect the propensity towards adopting information.

Keywords: Information Adoption, Verification Mark, Social Media, Vignettes.

1. Research background and questions

Nowadays with the increased use of social networking sites, it has become easy to access and share different types of information. The credibility of the information, however, is increasingly being called into question; credibility refers to the truth or believability of information. The dissemination of rumours and inaccurate information through social media has led researchers to investigate factors affecting the credibility of information. With the rapid development of social media, several new technical factors (e.g., verified accounts feature) play a role in the judgement of information credibility in this media. Furthermore, Yin et al (2018) stated that other factors, such as individual differences (e.g., gender) could be considered influential in evaluating information credibility. Hence, Yin et al. and Verma, Fleischmann & Koltai (2018) argue for the need for more studies to examine the role of gender differences and other demographic characteristics in credibility judgement, and in shaping the trust of Internet users.

A recent study by Allington et al (2021) focused on using social media as an information source about conspiracy theories about COVID-19 or general health information. In terms of COVID-19, the conspiracy theories refer to a set of beliefs about the virus's origin or beliefs that it is just a *'big trick'* (Allington et al., 2021). Their study revealed two interesting findings: 1) there is a negative relationship between using social media as an information source about COVID-19 and following health behaviours (e.g., hand-washing). 2) Social media use influences positively on believing in conspiracy theories about COVID-19. The findings from Allington et al.'s (2021) study were a motivation for the present study, as the use of social media as health information source may lead to the adoption of false information. Moreover, the individual differences between social media users could influence their attitudes towards evaluating information credibility. Thus, such differences need to be considered, in addition to other factors affecting evaluating information credibility, such as source credibility or message quality.

Furthermore, Sbaffi & Rowley (2017) argue for the need to conduct more studies about online health information credibility in non-Western countries, since most of the existing studies of online health information credibility have been conducted in Western countries (e.g., USA and UK). Conducting more studies in non-Western countries that have different cultures, such as Saudi Arabia, could lead to different findings concerning the information credibility of social media. Therefore, this study will focus on evaluating information credibility among social media platforms in Saudi Arabia. In particular, it aims to understand Saudi population's attitudes towards using social media as a health information source. Hence, two research questions are addressed as follows:

> *Q1. What factors influence the adoption of social media health information among social media platforms users in Saudi Arabia?*

Q2. How do the demographic factors of individuals affect the evaluation of health information credibility on social media platforms?

This study aims to add to the knowledge base regarding information credibility on social media platforms by providing insightful findings to information systems field, researchers and health professionals. The findings will identify the Saudi population's attitudes towards published health information on social media platforms, and which factors influence their attitudes. Hence, the health sector in Saudi Arabia and health professionals can more effectively utilise social media platforms as information source. This study's results may also encourage scholars to carry out similar or comparative studies in the future. Finally, a practical contribution concerns social media usage in the middle east countries, since most of the studies in this field have been conducted in western countries.

2. Literature review and hypotheses

2.1 Information Adoption

A related concept to seeking and using information is information adoption, which is referred to in the Oxford dictionary as "choose to take up, follow, or use" (Stevenson, 2010,p22). This word have been used widely in information credibility studies in different contexts such as online environment (e.g., Hussain et al., 2018) and social media (e.g., Erkan & Evans, 2016). Adoption of information refers to the extent to which the veracity of perceived information is evaluated and accepted as meaningful (Watts & Zhang, 2008). It mainly focuses on the process which information receivers use, evaluate and accept information. Based on reviewing the literature we found that information adoption is influenced by different factors, in particular content quality and source credibility (Sussman & Siegal, 2003). Source credibility can be measured using source expertise which refers to a set of characteristics of the message source, such as skills and knowledge (Rieh, Bates & Maack, 2010). Previous studies found that source expertise has a positive relation with adopting online and social media information (e.g., Filieri, Hofacker & Alguezaui, 2018; Syn & Kim, 2013). Thus, the following hypothesis has been formulated:

H1. Source expertise has a significant positive influence on perceived information adoption.

Another important dimension to information adoption is homophily, which is defined by Shamhuyenhanzva et al (2016, p. 440) as "the tendency of individuals to associate and bond with similar others who possess the same attributes and characteristics". It can be derived from perceived attributes (e.g., beliefs) or demographic factors (e.g., gender). Previous studies found that web and social media credibility and users' attitudes towards accepting information are significantly affected by homophily status (similarity) among internet users (e.g., Steffes & Burgee 2009). Studies revealed that receiving information from people who have **similar demographic factors (e.g., gender and nationality)** has a significant impact on the credibility of online information (Bracamonte & Okada, 2015; Hirvonen, Tirroniemi & Kortelainen, 2018). Thus, the following hypothesis has been formulated:

H2. The degree of similarity (in nationality & gender) between information source_receivers has a significant positive influence on perceived information adoption.

Moreover, with the recent development of social networking sites, account verification has become one of the influencing factors in the credibility of information published on verified accounts. Verified accounts refers to those accounts whose identity has been checked and validated by the platform management and granted a verification stamp (e.g., ✔). Previous studies found that individuals are more likely to seek and trust information from verified accounts than unverified accounts (e.g., AlMansour & Iliopoulos, 2015). This indicates that such technical feature as verification stamp could have an impact on adopting social media information among social media users. Thus, the following hypothesis has been formulated:

H3. The verification symbol on social media influence positively on perceived information adoption.

3. Research methodology

An online closed-ended questionnaire was used as the research method in this study for several reasons. First, Granjon & Benedic (2017) consider the online questionnaire as an appropriate method to reach computer literate users such as social media users. Hence, as this research will target social media users, publishing an online questionnaire will be a useful method for reaching a wide variety of respondents. Second, this research will target social media users in Saudi Arabia, which is one of the largest countries in the Middle East (Central

Intelligence Agency, 2020). Hence, as pointed out by Saunders, Lewis & Thornhill (2009), an online questionnaire could be a useful tool to reach respondents from geographically separated areas. Third, Saunders, Lewis & Thornhill (2009) state that questionnaires could be the most suitable method for examining relationships between variables. In this study, the questionnaire incorporates an experimental vignette design, which is defined as a collection of brief descriptions that can simulate the real world (Hou et al., 2021). Vignette is a valuable method for obtaining the participants' opinions or 'intended behaviour' toward multiple scenarios (Atzmüller & Steiner, 2010, p. 129). It is also a useful approach for combining different variables and manipulating them. Hence, using a vignette describing source characteristics within a questionnaire in this research could answer the research questions by investigating the relationship between various factors of information adoption on social media. Furthermore, Evans et al., (2015) suggest that bias may occur when asking participants direct questions or using closed-ended questions with predetermined answers. Therefore, implementing alternative methods, such as vignettes, may aid in preventing or reducing such bias. In other words, involving participants in hypothetical scenarios as vignettes may encourage them to carefully think and evaluate the situation, resulting in more realistic responses.

3.1 Questionnaire design

The questionnaire started with demographic questions about age, gender, education and social media usage. Also, a Five-point Likert scale from 1) strongly agree to 5) strongly disagree was used to measure information quality on social media. Questions of this scale were adopted from (Wixom &Todd, 2005; Hsu et al., 2016; Sulaiman, Adeyemi & Ayegun, 2020 & Steffes & Burgee,2009).

In order to achieve the research aim and examine the factors that influence information adoption on social media platforms, a novel experimental design (vignettes) has been adopted in this study. Essentially, we designed different types of profiles of Twitter accounts. As been discussed in the literature review, we identified three characteristics of the source that influence assessments of information credibility on social media: expertise, verification mark and homophily. Since the accounts on social media platforms might be verified – have the verification stamp near the account holder, (e.g. blue check on Twitter) – or unverified, we used the verification feature as a main factor for designing the experiments patterns. Specifically, we have two patterns of experiments: pattern A for a verified account, and pattern B for unverified account, and under each pattern we have 3 groups of profiles. Group 1) Medical expertise: as we addressed in H1 source expertise is predicted to have a significant positive influence on perceived information adoption. Based on this hypothesis, we designed two profiles of accounts on social media platform. Both accounts have a medical expertise and the same nationality as the participants (Saudi). Group 2) Non-medical expertise: in order to make a comparison with group 1, we designed two accounts for non-medical people, and both are from the same nationality as the participants. Finally, Group 3) Different Nationality: as we addressed in H2 source_receivers being similar in nationality is predicted to have a significant positive influence on perceived information adoption. Based on this hypothesis and in order to make a comparison with group 1 (the same nationality accounts), we designed two accounts for non-Saudi people, and both have a medical expertise. In total,

we produced 6 samples of vignettes (6 profiles). The questionnaire was designed in such a way that only two sets of profiles will be shown to each respondent. Vignettes of Group 1 were presented to all participants while those of Groups 2 & 3 were manipulated. For instance, groups 1 and 2 of vignettes were presented to participant A, whereas groups 1 and 3 of vignettes were presented to participant B. Figure 1 shows illustrative structure for the designed vignettes and a vignette sample (A):
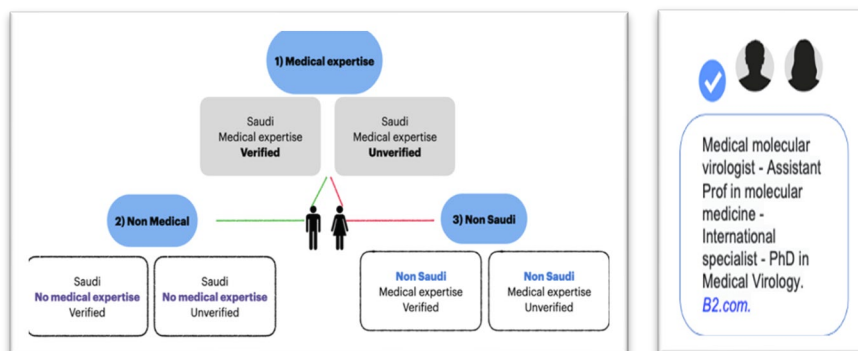

Figure1: Structure for the designed vignettes (6 profiles) & vignette sample.

To measure information adoption of the designed profiles, researchers used two dimensions: use and trust (e.g., Chen, Chua & Deng, 2018; Sussman & Siegal, 2003). The word use refers to "the action of using something or the state of being used for a purpose" (Stevenson, 2010, p. 612). Whereas trust is defined as "confidence in or reliance on some quality or attribute of a person or thing, or the truth in a statement" (Ibrahim et al., 2010, p.269). So we formulated two questions to examine information adoption: 1) how likely are you to trust the information provided by this source? and 2) how likely are you to use the information provided by this source? Then a scale of 5- points from 1) very likely – 5) very unlikely by (Martin et al., 2016; Goldsmith & Horowitz, 2006) was utilised to measure information trust and use. For the 1st experiment of (group1), we have 8 items as we used variables as (verified/ unverified), (same gender/ different gender) for the whole experiments. For the 2nd and 3rd experiments of (group 2 & 3), we have 4 items, as we combined the different gender source with a verified account and same gender source with an unverified account. An example of the asked items under vignettes is "if the account A belongs to a Saudi doctor/ he has same gender as you, how likely are you to trust the provided information from this source?".

4. Findings

This study utilised an online questionnaire to examine people's attitudes towards using social media as health information source among Saudi users of social media. The questionnaire was filled out by 397 participants with 50.38% of males and 49.62% of females. For age groups of the participants: 18-24= (28%), 25-34 = (34%), 35-44 = (27%), 45-54 = (7%), 55-64 = (3%) and 65+ = (.25%). For education background: 52% of the participants have a bachelor's degree, 26% of the participants have a postgraduate degree, and 19% of the participants have a secondary school education. Although the researcher utilised multiple social media platforms to reach participants with as diverse demographic characteristics as possible, the majority of responders were from young and adult age groups (18-44). This may suggest that the questionnaire was reached by younger and adult individuals. This could be related to the fact that Saudis aged 18 to 44 use social media platforms more frequently than those aged 55+. According to We Are Social statistics (June 2021), 88% of social media users in Saudi Arabia are between the age 18-44, namely 21% of the 18-24 age group, 51% of the 25-34 age group, 16% of the 35-44 age group and only around 8% of the 45+ age group. Findings also showed that there is a high use of social media platforms among the study sample. For the period of using social media platforms, a majority of the respondents, around 96%, stated that they have used social media platforms for more than two years, only 2.8% of respondents stated that they have used social media platforms between a year and two years. Google and social media platforms were found to be the most used sources of health information among participants. Findings also revealed that timeliness, completeness, relevance and accuracy of information were found to be influential on attitudes toward adopting social media information.

4.1 Data analysis

4.1.1   Reliability

To measure the reliability of 5-point Likert scale questions, Cronbach's Alpha was used. The values of Cronbach`s Alpha in Table 1 show that there is an acceptable degree of reliability of study dimensions (information quality, information adoption of experiment 1, 2 & 3) where Cronbach`s Alpha > 0.6.

Table 1:Cronbach`s Alpha for Reliability

Dimensions	Number of Items	Cronbach`s Alpha
Information quality	6	0.600
Information adoption of (Experiment of group 1)	8	0.869
Information adoption of (Experiment of group 2)	4	0.839
Information adoption of (Experiment of group 3)	4	0.848

4.1.2   Mann-Whitney test for measuring information adoption for experiments

In the vignettes, we want to understand what factors influence people's attitudes towards adopting social media information. The Mann-Whitney test was used to test the hypotheses and check the differences between groups.

Table 2:Mann-Whitney test for measuring information adoption

Group		N	Mean Rank	Sum of Ranks	z	p-value
Information adoption * Verification	Unverified	397	346.35	137499.50	-6.302	0.0001
	Verified	397	448.65	178115.50		
Information adoption * Medical expertise	No Medical	182	229.23	41949.50	-6.006	0.0001
	Medical	397	318.74	126540.50		
Information adoption * Nationality	Non-Saudi	215	276.84	59520.00	-3.073	0.002
	Saudi	397	322.56	128058.00		

According to table 2, there is a significant difference in information adoption according to the verification feature where p-value <0.05. The mean rank for verified accounts (448.65) is higher the mean rank for unverified accounts (346.35). There is a significant difference in information adoption according to the medical expertise where p-value <0.05. The mean rank for medical accounts (318.74) is higher the mean rank for non-medical accounts (229.23). Finally, there is a significant difference in information adoption according to the nationality, where p-value <0.05. The mean rank for Saudi accounts (322.56) is higher the mean rank for non-Saudi accounts (276.84).

4.1.3   Effects of demographic characteristics of the participants on information adoption

To measure the influence of demographic factors on information adoption, the Mann-Whitney test and Kruskal Wallis test were performed. The findings as seen in Tables 3, 4, 5 & 6 show that only gender has a significant influence on adopting information from verified and same gender accounts where (p-value <0.05). Specifically, female participants were found to be more likely to adopt information from verified accounts and same gender source compared to males. For other demographic characteristics (age, education & use frequency of social media), no significant differences between demographic groups were found.

Table 3 & 4: Mann-Whitney results for gender & age

Information Adoption	Gender	N	Mean Rank	Mann-Whitney	P-value	Adoption	Age	N	Mean Rank	Mann-Whitney	P-value
Information adoption *Verification feature	Male	200	182.66	-2.87	0.004	Information adoption *verification	18-34 years	246	200.63	-0.362	0.717
	Female	197	215.59				35 and more	151	196.35		
	Total	397					Total	397			
Information adoption * Medical expertise	Male	200	192.72	-1.1	0.26	Information adoption * Medical expertise	18-34 years	246	198.82	-0.04	0.968
	Female	197	205.37				35 and more	151	199.29		
	Total	397					Total	397			
Information adoption * Same gender	Male	200	186.23	-2.243	0.025	Information adoption * Same gender	18-34 years	246	204.08	-1.129	0.259
	Female	197	211.97				35 and more	151	190.73		
	Total	397					Total	397			
Information adoption * Same nationality	Male	200	192.72	-1.1	0.269	Information adoption * Same nationality	18-34 years	246	198.82	-0.04	0.968
	Female	197	205.37				35 and more	151	199.29		
	Total	397					Total	397			

Table 5 & 6: Kruskal Wallis results for education and frequency of use

Information Adoption	Education	N	Mean Rank	Kruskal - Wallis	p-value	Information Adoption	How often do you use social media?	N	Mean Rank	Kruskal - Wallis	P-value
Information adoption *verification	Primary	1	367.00			Information adoption *Verification	Several Times a day	378	201.26		
	Intermediate	6	185.17				Once A Day	10	156.75		
	Secondary	77	189.54	3.64	0.45		3-5 Times/week	4	187.00	3.9	0.63
	Bachelor	208	197.04				Every few weeks	2	144.25		
	Postgraduate	105	209.01				Less often	1	97.00		
	Total	397					Other	2	112.25		
							Total	397			
Information adoption * Medical expertise	Primary	1	386.00			Information adoption * Medical expertise	Several Times a day	378	200.95		
	Intermediate	6	128.83				Once A Day	10	153.70		
	Secondary	77	177.54	8.58	0.07		3-5 Times/week	4	186.13	2.6	0.75
	Bachelor	208	205.68				Every few weeks	2	160.25		
	Postgraduate	105	203.73				Less often	1	171.00		
	Total	397					Other	2	136.00		
							Total	397			
Information adoption * Same gender	Primary	1	389.00			Information adoption * Same gender	Several Times a day	378	200.87		
	Intermediate	6	188.67				Once A Day	10	165.20		
	Secondary	77	192.06	3.16	0.53		3-5 Times/week	4	177.13	3.5	0.55
	Bachelor	208	199.51				Every few weeks	2	158.50		
	Postgraduate	105	201.86				Less often	1	229.50		
	Total	397					Other	2	84.50		
							Total	397			
Information adoption * Same nationality	Primary	1	386.00			Information adoption * Same nationality	Several Times a day	378	200.95		
	Intermediate	6	128.83				Once A Day	10	153.70		
	Secondary	77	177.54	8.58	0.07		3-5 Times/week	4	186.13	2.6	0.75
	Bachelor	208	205.68				Every few weeks	2	160.25		
	Postgraduate	105	203.73				Less often	1	171.00		
							Other	2	136.00		
							Total	397			

5. Discussion and Conclusion

This study aims to examine factors influencing health information adoption from social media platforms among Saudi users. The findings revealed that there is an established use of social media platforms as a health information source. The novel vignette design allowed us to measure participants' perceptions of information sources with different characteristics. For all the users, it was found that the verification mark and receiving information from a source with medical expertise had a significant influence on user adoption of the social media health information, and similarity in nationality and gender also positively influenced participants' attitudes towards adopting health information. Furthermore, adoption of social media information was found to be affected by characteristics of information quality such as timeliness, completeness, relevance, and accuracy. For the female participants, the positive influence of verification mark and same gender source were stronger than for male participants, suggesting there may be differences in the information seeking behaviour of male and female information seekers in Saudi Arabia.

Although we had expected that the source expertise would positively impact attitudes towards adopting information, the response to the verification mark in the Group 2 results, without medical expertise, was also very strong. Gender also affected the response to verification mark. However, the survey results did not provide any data that could explain these phenomena. Therefore, a second phase of the study is currently underway in which selected participants of both genders have been interviewed. This may help to gain a deeper understanding of the rationale underlying their information seeking behaviours and which other sources they use to find medical information.

We believe that our study findings provide helpful insights to health organisations regarding utilising social media platforms to convey health information to the Saudi population. For example, female experts with verified accounts are likely to be the best sources for providing health messages to Saudi females.

This work makes a practical contribution to the study of social media usage in middle east countries which have been under researched compared to western countries. Future work should include comparative studies of social media usage across different cultures. Furthermore, a methodological contribution could be provided to the literature regarding using vignettes experiment design. We found that vignettes are a valuable tool as they enabled us to combine and manipulate different variables, such as source expertise and nationality with verification mark. Consequently, the approach is recommended for future research that aims to manipulate variables or examine individuals' attitudes towards different characteristics or situations in which social media is used.

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