

Social Media; its role in the infodemic of COVID-19

Original Article

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ABSTRACT

Introduction: A pandemic is defined as an outbreak of a disease that occurs over a wide geographic area and affects an exceptionally high proportion of the global population.

Objective: This study aims to observe the discrepancies that social media provides users in terms of information regarding COVID-19 and how that information can affect practices for prevention against the virus.

Methods: A cross-sectional study, with a non-probability convenience sampling technique, was conducted during April 2020. An online survey was created on Google Forms in the English language, and participants were invited to complete and submit the form. A total of 402 responses were received in one month. Citizens of age 18-60 partook in the study, and respondents tested positive for Covid-19 were excluded from the study as it could lead to bias.

Results: A total of 375 responses were selected out of the 402 responses received. Six responses were excluded who tested positive for Covid-19, and 21 responses were rejected as they were filled incompletely. The mean age of respondents was 27.53 years (S.D 8.188), and there were more females, 52.53% (n=197) than male, 46.67%(175) participants. A Pearson correlation (r) of 0.383 between knowledge and practices of people who use social media as their primary source of information suggests a moderate linear correlation. People who did not use social media as their primary source of information had a stronger linear correlation (r=0.640) between knowledge and practices.

Conclusion: According to the study, social media provided people with correct knowledge as well as encouraged efficient practices while also contributing to the spread of false news and malpractices.

Keywords: COVID-19, Social Media, Pakistan, Pandemic, Infodemic

INTRODUCTION

A pandemic is defined as an outbreak of a disease that occurs over a wide geographic area and affects an exceptionally high proportion of the global population. [1] The current world is facing a similar situation in Corona Virus Disease (COVID-19), which was declared a 'pandemic' by the World Health Organization on March 11, 2020. [2] The initial cases of COVID-19 occurred in Wuhan City, China, in December 2019. They were originally classified as "pneumonia of unknown etiology" as the causative agent was unknown then. [3] According to the World Health Organization (WHO), the number of confirmed cases worldwide has soared over thirty million, with more than one million fatalities. [4] Pakistan identified its first COVID-19 case on February 26, and over two months, there have been 15,525 cases with 343 deaths and 3,425 recoveries. [5] Previous coronavirus outbreaks include the Severe Acute Respiratory Syndrome (SARS)-CoV and Middle East Respiratory Syndrome (MERS)-CoV epidemics. [6,7] COVID-19 chiefly infects the lower respiratory tract, which can be fatal. Human transmission of the virus is through respiratory droplets, projected in the air during talking, coughing, sneezing, and infecting another person. [8,9] Symptoms usually appear after 14 days of exposure classically, including fever, cough, dyspnea, headache, and diarrhea. [10,11,12,13] The rapidly evolving epidemiology of the disease has led to tons of information being disseminated amongst the public. The keyword 'Corona Virus' showed a relevance of 100 (on a scale of 0-100) on Google trends between



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March 15-21, an increase of 1011% from its value on February 27.[14] Social media was regarded as the primary source of information regarding COVID-19 across various countries.[15] Its easy accessibility also carries a significant chance of ambiguous, misleading, or even fake news.[15] People do not always recheck or confirm the facts and figures they come across before implementing a measure or sharing it, which further extrapolates the false news pool.[16] The Director-General of WHO stated "But we're not just fighting an epidemic; we're fighting an infodemic. Fake news spreads faster and more easily than this virus, and is just as dangerous." [15]

According to the Digital Data Report 2020, 37 million of Pakistan's population actively use social media.[17] With such many people using social media regularly, without rechecking news from an authentic source, it is nearly impossible to limit the spread of false information. It also reflects the vital role of social media in educating people about the virus, which may prevent its spread. However, it is crucial to avoid the spread of unauthentic material and make sure that people do not follow or believe in such statements. This study aims to observe the discrepancies that social media provides users in terms of information regarding COVID-19 and how that information can affect practices for prevention against the virus.

RATIONALE

This study aims to observe the discrepancies that social media provides in terms of information regarding COVID-19 and its influence in affecting practices for prevention against the disease. Also, it compares the knowledge and practices of SM users and NON-SM users as their primary source of information regarding COVID-19, concluding which group is better equipped with precautionary measures to fight this pandemic. The current study emphasized mostly on an unexplored subject regarding available literature.

METHODOLOGY

Study Design and Sampling

A cross-sectional study, with a non-probability convenience sampling technique, was conducted during April 2020. A total of 402 responses were collected online from the metropolitan city of Karachi, Pakistan. The sample size of 384 was calculated using openepi.com with a double-sided confidence interval of 95% and a 5% error margin. Citizens of age 18-60 partook in the study, and respondents tested positive for Covid-19 were excluded from the study as it could lead to bias. The initial section of the

questionnaire consisted of a portion of consent, which informed the participants about the study's objective, their voluntary participation, and the maintenance of privacy of their data.

Data Collections and Measures

An online survey was created on Google Forms in the English language, and participants were invited to complete and submit the form. The survey questionnaire was designed carefully after an extensive literature review and was based on the course material of COVID-19 provided by WHO.[18] After designing a rough draft of the questionnaire, it was modified in two steps. Firstly, the study tool was sent to researchers and professionals from the medical background to analyze its simplicity and reliability. Secondly, a pilot study was conducted by selecting a small sample of the general population (n = 20) to test its practicality and affectivity. At the end of the survey, the partakers gave their feedback and amendments, which were considered, and the questionnaire was modified accordingly while ensuring its consistency with the published literature. After a thorough discussion, the questionnaire was finalized and approved by all authors and subsequently distributed. The data of the pilot study was not used for the final analysis.

The questionnaire comprised of three sections. The first section entailed questions about socio-demographics, including age, gender, education, and occupation, followed by a question inquiring about their primary source of information regarding Covid-19, and lastly, whether or not they fact-checked the obtained information from an authentic source. A question was included asking whether the respondent have had been tested positive for Covid-19. The second and third sections dealt with information concerning practices and knowledge regarding COVID-19, respectively. A total of 12 statements on practices and 14 statements on knowledge were included, with each section consisting of an equal number of facts and myths. [19,20] For each of these statements, two response options were available upon which a score was calculated. In the practice section, these options included, 'I have heard/ read this statement' and 'I have implemented this measure to prevent/treat COVID-19', the latter being replaced by 'I think this statement is accurate' in the knowledge section.

A score of +1 and -1 was awarded if a participant had selected both options for a true and false statement, respectively. Similarly, a score of +0.5 (for a fact) or -0.5 (for false statement) was awarded if the

respondent had read/heard about it but did not believe it be true/did not implement it. No points were awarded if the first option, i.e., 'I have heard/ read this statement,' was not selected. Hence, a cumulative score ranging from negative six to positive six and negative seven to positive seven could be obtained for practice and knowledge sections. Subsequently, the respondents were categorized into those who used social media as their primary source of information and those who did not (social media v non-social media respondents) for ease of interpretation, analysis, and displaying of data. Lastly, at the end of sections 2 and 3, the respondents were asked how often they shared the information regarding practices and knowledge associated with COVID-19 with their friends and family.

Statistical Analysis

A spreadsheet was produced on Microsoft Excel 2019 for data input, which was later imported to Minitab v19.2 for all statistical analyses. For all quantitative data, mean and standard deviations were derived, whereas qualitative data were expressed in percentage and frequency. Inferential statistics were applied depending upon the nature of data and variables. Two sample t-tests were applied to each statement from the practices and knowledge section separately to determine the difference between respondents' mean performances using social media as their primary source of information and those who do not. Two sample t-test was also applied to the

same classification of respondents (social media and non-social media) to assess the difference by socio-demographic characteristics. A Pearson-rank correlation test was performed to find any correlation between all the respondents' practices and statement,' was not selected. Hence, a cumulative score ranging from negative six to positive six and negative seven to positive seven could be obtained for knowledge. A p-value of less than 0.05 ($p < 0.05$, CI 95%) was considered significant in all tests.

RESULTS

Characteristics of the respondents

We received the survey from 402 people, out of which 375 responses were selected (Table 1[[Supplementary Material File 1](#)]). Six responses were excluded who tested positive for Covid-19, and 21 responses were rejected as they were filled incompletely. The mean age of respondents was 27.53 years (S.D 8.188), and there were more females, 52.53% (n=197) than male, 46.67% (175) participants. Majority of the participants 81.6% (n=306) were aged 18 to 30 years, 8.53% (n=32) aged between 31 to 40 years, 5.6% (n=21) aged between 41 to 50 years and only 4.27% (n=16) aged 51 to 60 years. From the total respondents, 56.27% (n=211) were undergraduates, 22.4% (n=84) were postgraduates, 20.27% (n=76) were A level or Intermediate students while only 1.07% (n=4) were O level or Matriculation students. Students submitted the

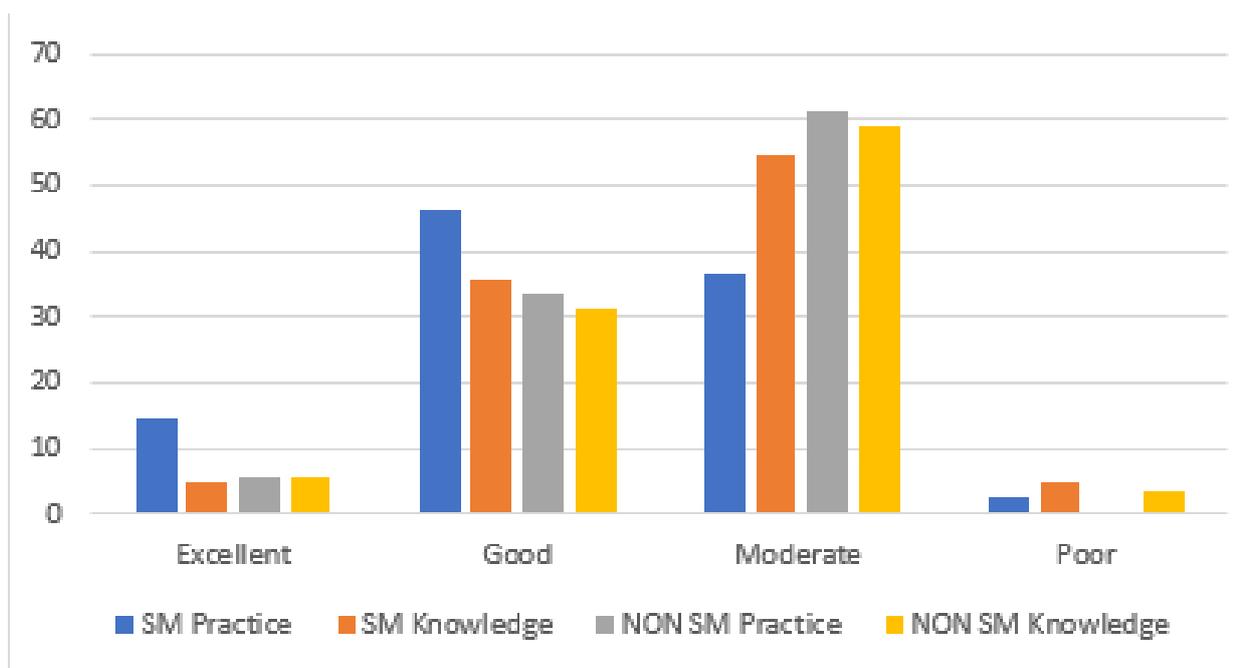


Figure 1: Performance Grading of respondents

*SM = respondents using social media as their primary source of information

*NON SM= respondents not using social media as their primary source of information

highest number of responses, 69.6% (n=261), and those who worked in the corporate sector, 13.3% (n=50).

Performance grading

Figure 1 shows the percentage of respondents (%) against the classification of their scores.

The scores for each section were divided into four categories with scores above three graded 'Excellent', $0 \leq x \leq 3$ graded 'Good', $0 \leq x \leq -3$ graded 'Moderate' and below -3 graded poor. A more significant number of SM users were graded 'Excellent' than NON-SM participants in the 'Practice' section. However, the opposite was observed in the 'Knowledge' section. Subsequently, SM users had a higher frequency of 'Good' score than NON-SM participants in both sections.

Knowledge and Practices among different socio-demographic factors

The relation between socio-demographic characteristics and knowledge and practices about COVID-19 of the two groups is demonstrated in Table 1. A 2-sample t-test was applied to compare knowledge and practices among different sociodemographic characteristics of the two groups. The mean scores and standard deviation (SD) of Practice for males who chose social media as their primary source of information (labeled SM) were (0.92 ± 2.01) compared to males who did not choose social media as their primary source of information (labeled NON-SM) were (0.19 ± 1.93) . Hence, a statistically significant difference between the values ($p < 0.05$) was noted. However, NON-SM scored better (0.13 ± 1.58) than SM (0.07 ± 1.68) in Knowledge with no statistically significant difference ($p > 0.05$) observed. SM females scored better in Practice (1.24 ± 2.05) than NON-SM (0.45 ± 2.05) with a statistically significant difference ($p < 0.05$). SM aged 18-30 scored better in Practice (P) (1.16 ± 2.10) and Knowledge (K) (0.07 ± 1.73) than NON-SM (P = 0.35 ± 1.96) (K = 0.06 ± 1.53) with a statistically significant difference ($p < 0.05$) in Practice section. Similar trend was also observed in age range of 51-60.

NON-SM aged 31-40 scored better in Practice (0.93 ± 2.28) and Knowledge (0.43 ± 1.90) than SM (P = $0.92 \pm$

1.74) (K = -0.14 ± 1.76) with a statistically significant difference ($p < 0.05$) in Knowledge section.

SM in A levels/Intermediate scored better in both Practices (1.35 ± 2.00) and Knowledge (0.32 ± 1.62) than NON-SM (P = -0.55 ± 1.49) (K = -0.82 ± 1.03) with a statistically significant difference ($p < 0.05$) in both sections.

SM students scored better in both sections (P = 1.07 ± 2.12) (K = 0.06 ± 1.69) than NON-SM (P = 0.11 ± 1.88) (K = -0.15 ± 1.71) with a statistically significant difference ($p < 0.05$) in Practice section. Self-employed SM users also scored better than NON-SM in both sections. NON-SM participants employed in Government sector had greater score (P = 1.75 ± 3.18) (K = 2.25 ± 1.77) than SM (P = 0.61 ± 1.27) (K = -0.39 ± 1.13), a statistically significant difference ($p < 0.05$) in both sections. NON-SM employed in Healthcare sector (0.80 ± 1.35) scored better than SM (-0.50 ± 3.08) in Knowledge section with a statistically significant difference ($p < 0.05$).

Table 2 [Supplementary Material 2] compares the knowledge and practices of respondents who use social media as their primary source of information (SM) compared to those who do not (NON-SM). A 2-sample t-test was applied to all the statements of knowledge and practices, and the impact of social media was determined according to each statement.

Pearson correlation (Table 3) was used to investigate the relationship between knowledge and practices of people who use social media as their primary source of information (SM) as well as for those who did not (NON-SM).

A Pearson correlation (r) of 0.383 between SM's knowledge and practices suggested a moderate linear correlation. Whereas, NON-SM displayed a stronger linear correlation ($r = 0.640$).

DISCUSSION

In terms of the results in Table 1 [Supplementary Material 1] of the social demographic responses, females, which constituted 52.5% of the total responses (n=375), scored a more significant and more positive mean than men (46.7%) in all corresponding components of knowledge and practices (K&P) both in users of social media (SM) and non-social media (NON-

	Correlation co-efficient	p-value
SM	0.383	0.00
NON SM	0.640	0.00

Table 3: Pearson's Correlation

Key: SM= Social media users, NON-SM= Non-social media users.

SM). Thus according to the study, females are better equipped in the face of the pandemic and possess better Knowledge & Practices in terms of prevention regarding COVID-19. People of all age groups should be well aware and prepared. However, age groups > 50 should be better equipped as they fall under the criteria for being most predisposed to adverse effects of COVID-19; Table 1 [Supplementary Material 1] shows that participants who used SM in the age 51-60 had the highest mean (+0.33) out of all the age groups using social media, this is a positive finding showing that those who are most susceptible to fall critically ill have the most knowledge. They also had a mean value more significant than those of the same age group but not using social media.

Participants using social media (n=321) initially showed promising results as 0 responses were recorded as having "poor knowledge," and 149 responses were recorded as having "good knowledge" according to the scale made for the study. To inquire how much deviation inaccurate information is produced due to the knowledge and practices brought about by social media, the data and scores of participants who chose social media as their primary source of information were collectively compared to the participants who chose all other sources. This comparison provided a basis on how much significance can be produced between data sets and which questions regarding knowledge and practices showed significant differences.

The current pandemic participants should ideally show an increased knowledge score, i.e., positive mean, which corresponds to their effectiveness regarding hygiene-related adversities, which better equip them in dealing with the pandemic. Statements corresponding to daily fake news circulated on social media listed as the first eight rows of Table 2 [Supplementary Material 2] showed a negative mean throughout, thus showing that an ideal positive score was not demonstrated in participants using SM as the primary source of information. The negative mean was also present in participants using NON-SM as their primary source, and Table 2 [Supplementary Material 2] showed a $p > 0.05$ demonstrating no significant difference in knowledge between social media (SM) and non-social media users (NON-SM). This shows that in terms of false knowledge portrayed on both mediums, there was no significant difference in the results, and both results were less than ideal being on the negative side of the scale, in terms of factual statements tested in the remainder of Table 2 [Supplementary Material 2] both SM and NON-SM users scored on the positive side of the scale (mean = < 0) exhibiting the fact that both sets

of users possess false and correct knowledge with no significant difference.

Practices in the face of this pandemic should also ideally give a positive mean if they are to put in place better measures of precaution successfully. In Table 3, 5 out of the total of six correct practices inquired on had more positive means for SM users than NON-SM. This difference demonstrates that SM users have better general practices as compared to NON-SM users, and ideally, SM is providing users with significantly accurate information regarding practices. All these five statements have a $p < 0.05$ when SM and NON-SM are compared, thus statistically proving the difference is significant. The most significant difference was observed in the practice statement "Hand sanitizers are an effective alternate to washing hands with a soap," which showed a mean of +0.583 in SM users compared to only +0.315 in NON-SM users and a p value = 0.00. Hand sanitizers are a beneficial secondary practice to apply when soap washing is unavailable, and SM users had a very significant positive response as compared to NON-SM. Regarding incorrect practices and their values, SM users had a more negative mean in all statements asked, and the difference compared to NON-SM was not significant (p value > 0.05) for 5 out of the six practices asked. These results portrayed that both sets of users had inadequate precautionary measures by following incorrect practices and that these sources, instead of having a positive impact on what practices should be implemented, had a negative one across the board.

CONCLUSION

Findings thus provided information that both sets of users believed false news but simultaneously had a better grasp of the correct news. SM users' practices were significantly better in terms of correct practices exercised than NON-SM, but these same users had more false practices as well. According to the study, social media provided people with correct knowledge as well as encouraged efficient practices while also contributing to the spread of false news and malpractices.

LIMITATIONS

To eliminate bias, the partakers were chosen randomly, and the questionnaire was distributed online, thus providing complete privacy to the respondent eradicating interviewer bias. However, the distribution of the survey through the internet allowed only those who can read and have internet access to participate. This represents a major limitation of this study. Moreover, responses mainly depend upon honesty and recall ability, thus rendering recall bias. Potential

sample clustering might also limit the generalizability of the study

REFERENCES

1. Pandemic [Internet]. Merriam-Webster. [cited 2020 May 4]. Available from: <https://www.merriam-webster.com/dictionary/pandemic?src=search-dict-hed>
2. WHO Director-General's opening remarks at the media briefing on COVID-19 – 11 March 2020 [Internet]. Who.int. 2020 [cited 4 May 2020]. Available from: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-COVID-19-11-march-2020>
3. Cascella M, Rajnik M, Cuomo A, Dulebohn SC, Di Napoli R. Features, Evaluation and Treatment Coronavirus (COVID-19) [Internet]. StatPearls. 2020[cited 4 May 2020]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK554776/>
4. WHO. Coronavirus disease (COVID-19) Situation Report– 104 [Internet]. 2020. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200503-covid-19-sitrep-104.pdf?sfvrsn=53328f46_2
5. COVID-19 Health Advisory Platform by Ministry of National Health Services Regulations and Coordination [Internet]. Ministry of National Health Services Regulations and Coordination. 2020 [cited 2020 May 4]. Available from: <http://covid.gov.pk/stats/pakistan>
6. Ibrahim IM, Abdelmalek DH, Elshahat ME, Elfiky AA. COVID-19 spike-host cell receptor GRP78 binding site prediction. J Infect. 2020;80(5):554-562.
7. Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. Journal of Autoimmunity. 2020;:109:102433.
8. Shereen MA, Khan S, Kazmi A, Bashir N, Siddique R. COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. Journal of Advanced Research. 2020;24:91-98.
9. World Health Organization. Modes of transmission of virus causing COVID-19 [Internet]. Sci Br. 2020 [cited 4 May 2020]. Available from: https://apps.who.int/iris/bitstream/handle/10665/331601/WHO-2019-nCoV-Sci Brief-Transmission_modes-2020_1-eng.pdf
10. Google Trends [Internet]. 2020 [cited 4 May 2020]. Available from: <https://trends.google.com/trends/explore?q=Corona%20virus>
11. Keyword statistics [Internet]. Wordstat.yandex.com. 2020 [cited 10 May 2020]. Available from: <https://wordstat.yandex.com/#!/?words=coronavirus>
12. Nielsen RK, Fletcher R, Newman N, Brennen JS, Howard PN. Navigating the 'Infodemic': How People in Six Countries Access and Rate News and Information about Coronavirus [Internet]. Misinformation, Sci Media. 2020 [cited 4 May 2020]. Available from: <https://reutersinstitute.politics.ox.ac.uk/infodemic-how-people-six-countries-access-and-rate-news-and-information-about-coronavirus>
13. Pennycook G, McPhetres J, Zhang Y, Lu JG, Rand DG. Fighting COVID-19 Misinformation on Social Media: Experimental Evidence for a Scalable Accuracy-Nudge Intervention. Psychol Sci. 2020;1-24. Available from: http://ide.mit.edu/sites/default/files/publications/COVID-19%20fake%20news%20ms_psyarxiv.pdf
14. Munich Security Conference [Internet]. Who.int. 2020 [cited 4 May 2020]. Available from: <https://www.who.int/dg/speeches/detail/munich-security-conference>

security-conference

15. Digital 2020: Pakistan — DataReportal – Global Digital Insights [Internet]. DataReportal – Global Digital Insights. 2020 [cited 4 May 2020]. Available from: <https://datareportal.com/reports/digital-2020-pakistan>
16. Kevin M. Sullivan a. OpenEpi – Toolkit Shell for Developing New Applications [Internet]. Openepi.com. 2020 [cited 5 May 2020]. Available from: <https://www.openepi.com/SampleSize/SSPropor.htm>
17. Impact of social media on knowledge and practices regarding COVID-19 https://docs.google.com/forms/d/e/1FAIpQLSehdqwGejUZIilaBVbEXhKRC-7wliAjI4EZ6OGaHkLTzBNQg/viewform?usp=sf_link
18. Coronavirus [Internet]. Who.int. 2020 [cited 4 May 2020]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
19. Coronavirus Disease 2019 (COVID-19): Practice Essentials, Background, Route of Transmission [Internet]. Emedicine.medscape.com. 2020 [cited 5 May 2020]. Available from: <https://emedicine.medscape.com/article/2500114-overview>
21. Myth busters [Internet]. Who.int. 2020 [cited 4 May 2020]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters>

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CONFLICT OF INTEREST

The author declared no conflict of interest

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All the data shared is under terms of [CC BY](#). The Supplementary Material contains 2 tables in PDF format with size less than 500 kb and can be downloaded from these URLs;

1. Supplementary Material 1: <https://wp.me/abyAqB-N5>
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