From Panic to Playfulness: A Journey Through the Covid-19 Pandemic

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Table of Contents

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Abstract

Background: On 30th January 2020, the World Health Organisation (WHO) announced the Covid-19 outbreak to be the sixth emergency services public health (SPHEC) epidemic (Waris et al., 2020). Federal Ministry of Health in Pakistan confirmed the first case of Covid-19 on 26th February 2020, in a Pakistani student returning from Iran. Over span of 15 days, 20 confirmed cases were diagnosed with Covid-19 in the province of Sindh, where highest numbers of cases were reported (Waris et al., 2020). On 27th June 2020, the numbers have reached to 198,883 confirmed cases with 86,906 recoveries and 4,035 deaths in the country . Geographically, Pakistan occupies a place of considerable significance, bordered on the west by Iran and on the northeast by China, where the number of cases and deaths during the pandemic remained enormously high, and eventually this became a major reason for the start of pandemic in Pakistan (Javed et al., 2020). Ergo, WHO officials have expressed grave concern over Pakistan that might become the next epicentre of Covid-19 pandemic (Qazi et al., 2020).

Objective: To asses different tonal behavior of people towards Covid-19 in online social media, Twitter.

Methods: In our study we used Whissell Dictionary of Affective Language (WDAL) to categorize people's emotions in terms of their activeness, passiveness, and imagination towards current outbreak. Present study looked at general population of country, which then naturally split in three types of account; namely, general users, news, and organizations.

Results: Organizations' response to Covid-19 on social media is more conscientious, active, and they are determined to take an appropriate action to stop this outbreak in any way possible. General users on other hand on Twitter have taken this outbreak nonserious and making fun of it. Although news accounts had posted nice messages together with unpleasant messages in our dataset, yet there is no positive attitude by general public towards taking serious steps to avoid Covid-19 spread.

Conclusions: Conclusion: Our results suggest, general public is being ignorant with regard to spread of virus despite strict measures taken by the government and positive and negative framing provided by news or journalists. Present research focused on English written tweets only. However, studying behavior people who write tweets in Urdu and the role of influential spreaders on online social media towards Covid-19 remained unsolved.

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Keywords: Covid-19, Pakistan, Social media, Twitter

Background

On 30th January 2020, the World Health Organisation (WHO) announced the Covid-19 outbreak to be the sixth emergency services public health (SPHEC) epidemic (Waris et al., 2020). Federal Ministry of Health in Pakistan[1] confirmed the first case of Covid-19 on 26th February 2020, in a Pakistani student returning from Iran. Over span of 15 days, 20 confirmed cases were diagnosed with Covid-19 in the province of Sindh, where highest numbers of cases were reported (Waris et al., 2020). On 27th June 2020, the numbers have reached to 198,883 confirmed cases with 86,906 recoveries and 4,035 deaths in the country[2]. Geographically, Pakistan occupies a place of considerable significance, bordered on the west by Iran and on the northeast by China, where the number of cases and deaths during the pandemic remained enormously high, and eventually this became a major reason for the start of pandemic in Pakistan (Javed et al., 2020). Ergo, WHO

[1] https://www.geo.tv/latest/274482-pakistan-confirms-first
[2] http://covid.gov.pk/

officials have expressed grave concern over Pakistan that might become the next epicentre of Covid-19 pandemic (Qazi et al., 2020).

Government strategies towards Covid-19

After WHO announced Covid-19 as a global pandemic, WHO insisted government of Pakistan to take extreme, serious, and rapid measures to avoid further spread of virus in country. Following the instructions given by WHO, Pakistan closed its border with China as an immediate response and tighten screening measures at the border between Pakistan and Iran (Z. Khan et al., 2020). Furthermore, the government enforced the screening of passengers at airports for inbound and outbound flights[3]. The Government of Pakistan is taking all possible measures against Covid-19 to provide and assure the responsibilities of the state for their people. To avoid the spread of Covid-19, the strategic plan of government includes early case identification, tracing and tracking of contacts, social distance, risk communication, quarantine, and isolation (Waris et al., 2020). Nonetheless, many people fail to understand the importance of social distance because of their attitudes. Consequently, the cases are continuously surging and these increasing number of infected cases will soon overwhelm the weak health care system of country in the coming days, unless the spreading is well managed.

Previous research in this area indicates that individual and collective behavior during a pandemic is of special significance. The principal way to manage outbreaks is to modify public behaviour in the absence of effective pharmacological treatments (Chen et al., 2017). Data regarding the outbreak, psychology and attitudes of the people together influence the spread of an epidemic and strategies based on these attributes can be used to manage an epidemic. The effect of Covid-19 is highly dependent on people's behaviour, which largely influence their understanding of Covid-19.

Prior research on Covid-19 in Pakistan have focused on awareness of disease among health care workers (Alwani et al., 2020; S. Khan et al., 2020; Saqlain et al., 2020) and public (Javaid1 and Javaid3, 2020; Mirza et al., 2020), challenges faced by country (Mamun and Ullah, 2020), infection control measure (Hassan et al., 2020; Massan et al., 2020; Mukhtar, 2020; Waqar Ali et al., 2020), illness (Hashmi and Saleem, 2020) and treatment (Ilyas et al., 2020). However, this outbreak highlighted the fragility of psychological strength, and we also need to pay attention to attitudes of ordinary people during an epidemic (Liu et al., 2020). At the time of this study, the epidemic curve in Pakistan was approaching the peak of the epidemic.

[3] https://www.aljazeera.com/news/2020/03/coronavirus-travel-restrictions-border-shutdowns-country-200318091505922.html

Belief of people towards Covid-19

The government of Pakistan is opening up the country despite country being on the top 10 list of countries in the speed of virus[4]. One of the reasons for rapid virus spread is; many people live in a state of denial and disbelief. For example, there is conspiracy theory especially among people coming from rural and lower middle class that discussing their symptoms to health worker simply means certain death[5]. And they believe government is trying to receive money from international aid agencies by showing more deaths due to coronavirus. Study has shown (Javed et al., 2020) that the ignorance and non-cooperative attitude displayed by the general public further fuelled the disease's rapid spread throughout the country. This prompted us to understand people's attitude at large scale by expressing and engaging their behaviour on social media.

Our null hypothesis states that "attitude of general public in Pakistan towards Covid-19 epidemic is ignorant and is one of the major factors for rising cases of Covid-19 in country". With the worldwide spread of the Covid-19 infection, individual activity on social media platforms such as Facebook, Twitter, and YouTube began to increase. A number of studies have shown that social media can play an important role as a source of data for detecting outbreaks but also in understanding public attitudes and behaviors during a crisis as a way to support crisis communication and health promotion messaging (Oh et al., 2020). The main aim of the present study was therefore to assess the attitude and thoughts of people on Twitter, a social media.

Methods

Since majority of Pakistan's population has an access to internet (Hayat et al., 2020), and use of social media is at its peak during this Covid-19 outbreak. Thereafter, in the design of this study, we leveraged data that was being generated by general users on Twitter to investigate their attitude and commitment towards Covid-19.

The research was initiated with Tweets collection, cleaning and data preparation process. We extracted tweets using a Twitter API and gathered 18,070 tweets from 21st November 2019 to 19th June, 2020. Our search was limited to tweets in English language, hashtag and keywords of "Corona", "Covid-19", and "Coronavirus". This ensured a textual corpus focused on the Coronavirus, Covid-19 and associated phenomena, and reflects an established process for topical data acquisition. Extracted data often contain information about geographic locations, such as city, county, state and country level data or by holding zip code and longitude and latitude coordinates, or

[4] https://reliefweb.int/report/pakistan/pakistan-covid-19-situation-report-10-june-2020

[5] https://thediplomat.com/2020/06/pakistans-confused-covid-19-response/

geographical metadata. Such data are said to be "geotagged", and "Geo-tagged Analytics" represents the analysis of data inclusive of geographical location variables or metadata (Samuel et al., 2020). Therefore, we adopted geo-code filtering to minimize bias in our dataset (Morstatter et al., 2013). In present study, we focused on geo-tagged tweets within a bounding box in terms of the latitude and longitude of Pakistan. Each extracted tweet from the Twitter API contains extensive information, such as user ID, tweet ID, username, user biography, user screen name, user URL. The main tweet text contains information about emotions, thoughts, behaviours, and other information such as number of retweets, likes, and replies. All tweets were pre-processed after collection using KNIME[6], the Konstanz Information Miner. Duplicate tweets were removed, all tweets were converted into lower case, URL and picture links were removed.

Tweets were collected to develop a response to the following question: “What is the attitude of people towards Covid-19 or how they think of Covid-19?”. Twitter users in these tweets expressed their attitude towards Covid-19 based on worldwide spread of coronavirus. The study design involved analysis of these qualitative responses using the Whissell Dictionary of Affect in Language (WDAL). The WDAL was chosen because of its ability to empirically analysing attitude in terms of emotional tone, providing statistical text analysis regarding the emotional content of the tweets. As a dictionary, it contains 8742 words[7] which have been analysed for pleasantness, activation, and imagination (Hoover, 2015)(Whissell, 2009). In addition, all cleaned tweets were processed by RIOT Scan software that further classified emotional terms given in revised WDAL (Boyd, 2013).

Riot Scan generates emotional categories from WDAL and tag each tweet according to its emotion, namely; active, fun, high or low imaginary, nasty, nice, passive, pleasant, sad, and unpleasant. Each word in the dictionary has a decimal number rating between 1-3 for each of abovementioned categories. For example, the word "yesterday" in WDAL dictionary is rated 2.57 on the pleasantness scale, 1.83 on the activity scale, and 1.60 on the imagery scale. This would indicate that subjects found this word to be relatively pleasant, not particularly active (or passive), and somewhat difficult to imagine. All untagged and poor score tweets from Riot Scan were removed. Thereafter, our final dataset contained 14,950 tweets. Distribution of each category and analysis are given in subsequent sections of results and discussion.

Results

A total of 18,070 “Corona", “Covid-19”, and “Coronavirus” tweets were identified in the study time

[6] https://www.knime.com/

[7] http://www.cs.columbia.edu/~julia/papers/dict_of_affect/DictofAffectinLang.README.pdf

period. Of these, 14,950 tweets were finally processed for analysis. In this study, we analyzed attitude of people in terms of emotional tone using WDAL. Table 1 presents the characteristics of tweets analyzed. The results show that the majority of tweets presented passive behaviour 7,292 (48.8%), with 2,347 (15.7%) high imaginary and only 231 (1.5%) included unpleasant content.

Table 1 Individual tweet characteristics (n=14950)

Characteristics of tweets	Number (%)
Active	247 (1.7)
Fun	641 (4.3)
High Imaginary	2347 (15.7)
Low Imaginary	321 (2.1)
Nasty	336 (2.2)
Nice	629 (4.2)
Passive	7292 (48.8)
Pleasant	692 (4.6)
Sad	2214 (14.8)
Unpleasant	231 (1.5)

To understand the attitude, tweets were categorized into different users account namely, general users, news outlets or journalists and organizations (Table 2). When analysing Twitter accounts by user category, general users had more tweets (11998, 80.1%), followed by organizations (1588, 10.4%) and news outlets or journalists (1364, 9.1%). All these accounts had a high rate of passive tweets (50.1%, 50.7% and 36.9%). In addition, tweets posted by organizations included more active and sad tone when compared to those posted by news and general users. Conversely, general users had high rate of fun, pleasant and nasty tone whereas, news outlets or journalists were observed with significantly high rate of unpleasant tweets.

Table 2 Individual tweet characteristics based on users account (n=14950)

Characteristics of tweets	General users (%)	News (%)	Organizations (%)	Total (%)
Active	119 (1)	9 (0.7)	119 (7.5)	247
Fun	538 (4.5)	44 (3.2)	59 (3.7)	641
High Imaginary	1867 (15.6)	228 (16.7)	252 (15.9)	2347
Low Imaginary	273 (2.3)	22 (1.6)	26 (1.6)	321
Nasty	285 (2.4)	29 (2.1)	22 (1.4)	336
Nice	507 (4.2)	60 (4.4)	62 (3.9)	629
Passive	6014 (50.1)	692 (50.7)	586 (36.9)	7292
Pleasant	608 (5.1)	14 (1)	70 (4.4)	692
Sad	1643 (13.7)	193 (14.1)	378 (23.8)	2214

Unpleasant	144 (1.2)	73 (5.4)	14 (0.9)	231
Total	11998	1364	1588	14952

Table 3 represents number of replies, retweeted tweets and likes. Tweets with funny and sad tone had higher number of replies than tweets being liked or retweeted. Number of likes was not specifically associated with any particular tone. However, passive tweets had slightly more likes when compared to other tones.

Twitter accounts with general users had higher number of likes per tweet compared to other accounts. Furthermore, tweets posted by news outlets or journalists had more number of retweets per tweet. Organizations received more number of replies for their tweets in contrast to general users and news accounts.

Table 3 Accounts engagement, spread and likes

Characteristics of tweets	Number of replies (%)	Number of retweets (%)	Tweet likes (%)
Active	629 (2.9)	1086 (1.7)	2297 (1.1)
Fun	1566 (7.2)	2919 (4.5)	9135 (4.5)
High Imaginary	2729 (12.5)	7967 (12.3)	22616 (11.3)
Low Imaginary	401 (1.8)	1584 (2.5)	4358 (2.2)
Nasty	315 (1.4)	941 (1.5)	3362 (1.7)
Nice	1185 (5.4)	3105 (4.8)	8638 (4.3)
Passive	10024 (45.9)	31423 (48.7)	106154 (52.9)
Pleasant	971 (4.4)	6429 (10)	12036 (6)
Sad	3862 (17.7)	8492 (13.2)	30900 (15.4)
Unpleasant	172 (0.8)	623 (1)	1313 (0.7)
Users account	12979 (5.7)	50345 (22.2)	163116 (72)
General users	1454 (4.4)	9299 (28.1)	22307 (67.5)
News	21854 (26.8)	4925 (17.8)	15386 (55.5)

Organizations

Furthermore, to check more details of general users, we compare our data at gender level (Figure 1). Female accounts presented more active and sad tone towards Covid-19. However, males represented funnier and higher imaginary attitude as compared to females.

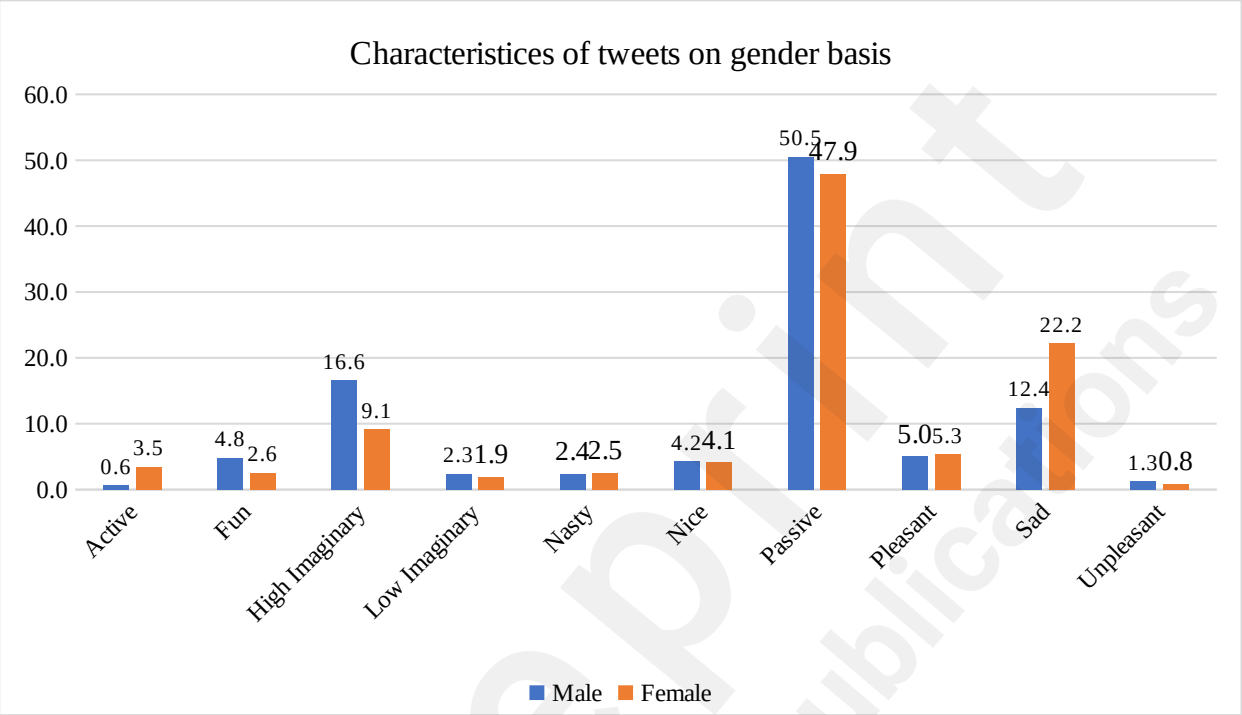

Figure 1. Distribution of tweets characteristics between males and females

Discussion

As mentioned above, most prior research has focused on the psychological status of patients and general public_or medical staff, during the epidemic, but little attention has been directed to the attitude and thoughts of general public towards Covid-19.

To the best our knowledge, this is the first study of general peoples' Twitter usage with respect to Covid-19 in Pakistan. Our findings determine that Twitter can be a dynamic tool to demonstrate individuals' attitude towards Covid-19 in terms of expression of their tones. We observed that individuals' response towards Covid-19 varies among different users accounts namely, general users, news, and organizations.

Findings of our study are contradictory to the study conducted by (Song et al., 2017) during MERS outbreak, in which 80% negative emotions were accounted for all Twitter posts. Results of our study indicate that nearly 50% individuals are suggestive of passive or neutral attitude. We believe that these individuals may believe that nothing will happen to them if they will be expose to Covid-19. In

addition to this, 16% are those who think Covid-19 as high imaginary. Consequently, only handful of tweets showed active behaviour. These results indicate that very small number of people who are worried and concerned about Covid-19, which has further proven by looking at only about 15% individuals who posted sad tweets.

Organisations' response to Covid-19 on social media is more conscientious, active, and they are determined to take an appropriate action to stop this outbreak in any way possible. General users on other hand on Twitter have taken this outbreak nonserious and making fun of it. Evidence suggests that social media largely spread negative messages (Choi et al., 2017). This in line with our results where majority of unpleasant tweets were posted by news or journalists. However, (Bavel et al., 2020) suggested whether more positive frame could educate the public to reduce negativity and increase response to public health. In response to Bavel et al (2020), although news accounts had posted nice messages together with unpleasant messages in our dataset, yet there is no positive attitude by general public towards taking serious steps to avoid Covid-19 spread.

In relation to tweets' number of replies, retweets, and likes; active behaviour towards Covid-19 tweets were less spread out than the passive related tweets. High imaginary tweets received more engagement (number of replies) and spread (retweeted), and so did fun related tweets about outbreak. At account level, general users' tweets had more likes, which could be reflection of other user's behaviour in the community. Similarly, news accounts received more likes but less spread of the words, that could be the indication of less concerning to general public. Lastly, organisations related accounts showed significant amount of replies compared to general users and news, which could be the sign of their activeness towards Covid-19.

Conclusion

Covid-19, a respiratory disease, is caused by enigmatic contagion that has infected more than 9 million people across the world and almost half million people have died. Pakistan remained Covid-19 free till end of February 2020, until virus carer from Iran came along. Iran was one of the worst hit countries for Covid-19 cases. Pakistan situation gotten worse when more pilgrims people came from Iran and tested positive. Despite strict measures imposed by government and efforts taken by healthcare workers, Covid-19 cases are keep increasing. Our results indicate that people's ignorant behaviour towards Covid-19 might be the reason for this rapid and continuous surge of positive cases. General public mindset remains unchanged even after providing useful information to tackle or stop the spread. Therefore, immediate strict actions are required to reduce the adverse consequences of Covid-19 actions that can be supported by social and behavioural science.

One of the contributions of this study is use of WDAL in online social network, especially to explain the research on emotional values. We contemplated, if study is conducted through one to one interview, would show the same results in terms of tonal values. The usefulness of using WDAL is quite apparent: researchers may use this approach to analyse emotional tone on online social networks for any specific problem. For example, proactive questions could be asked about how tone of people during outbreak on online social networks has changed since it started? Does the tone of people differ geographically, i.e., Asian vs European? Similarly, WDAL could be applied in marketing content to measure the tone of advertisement content, and so on.

Suggestions

Javed et al., concluded in their study that during the war against Covid-19, stakeholders, health care professionals, scientists, and the general public should join up in taking measures to fight Covid-19 and if not, the outbreak in Pakistan in no time would be as deadliest as it was in Iran, Spain and Italy (Javed et al., 2020). Our findings highlight that simple acquisition of lockdown, government's ambiguous and vague messages, and information might not necessarily produce promising results for controlling this pandemic. It also explains that provisional factors, such as favourable behavioral responses from the general public should be considered to fully grasp the dissemination of viruses in times of pandemics. Therefore, we recommend that sufficient knowledge and advice to the general public to improve their thoughts could be step forward to cope with current situation.

Limitations

Current study is not without its limitations. One of the major limitations of our study is that, we only focused on English written tweets due to the fact that WDAL is only applicable for English text. Whereas, still majority people of Pakistan write their posts in both actual syntax of Urdu and Roman Urdu (Urdu text written in English alphabet). Moreover, our study looked at general population of country, which then naturally split in three types of account; namely, general users, news, and organisations. Our study could look at the influencer personalities on Twitter to investigate the role they play, especially to their followers about taking essential steps to prevent this outbreak. In next step of our study, we plan to introduce machine learning techniques to automatically detect user's behaviour by identifying different tonal values.

Declaration

Authors contributions

BAT and ML provided conceptual framework for the project and drafted the paper. KRT and ZB provided guidance for interpretation of the data. BA and KRT analysed and interpreted the data. BAT

and SRT supervised the data analysis. BAT, ML and ZB reviewed the paper critically. All authors read and approved the final paper for publication. Funding The authors received no funding for the present study.

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Availability of data and materials

The datasets used in this study are available from the corresponding author upon reasonable request.

Ethics approval

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare there are no competing interests.

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