Meta-worry, anxiety and depression in the COVID-19 pandemic

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Metapreocupação, ansiedade e depressão na pandemia de COVID-19

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Resumo

Esta pesquisa analisou associações entre metapreocupações e sintomatologias ansiosa e depressiva no início da pandemia de COVID-19 no Brasil. Participaram do estudo 2.042 indivíduos, com idades entre 18-78 anos. Um questionário sociodemográfico, o *4-item Patient Health Questionnaire* e o *Meta-Worry Questionnaire* foram respondidos online. Quatro modelos de Regressão Logística foram utilizados para estimar o efeito das variáveis independentes sobre

as sintomatologias ansiosa e depressiva. As variáveis ser mais jovem, não ter renda fixa, perceber-se doente e exibir alto nível de metapreocupações ampliaram as chances de sintomas ansiosos e/ou depressivos. Concluiu-se que prover cuidado frente ao sofrimento psicológico é fundamental no combate à COVID-19, pois foram detectados fatores de suscetibilidade ao desenvolvimento de transtornos mentais no começo da pandemia no Brasil.

Palavras-chave: Ansiedade; Depressão; Metapreocupação; COVID-19.

Abstract

This research analyzed associations between meta-concerns and anxious and depressive symptoms at the beginning of the COVID-19 pandemic in Brazil. 2,042 individuals participated, aged 18-78 years. A sociodemographic questionnaire, the 4-item Patient Health Questionnaire and the Meta-Worry Questionnaire were answered online. Four Logistic Regression models were used to estimate the effect of independent variables on anxiety and depression symptoms. The variables being younger, not having a steady income, feeling ill, and exhibiting a high level of meta-worries increased the chances of showing symptoms. It was concluded that providing care in the face of psychological suffering is fundamental in combating COVID-19, since factors of susceptibility to the development of mental disorders were detected at the beginning of the pandemic in Brazil.

Keywords: Anxiety; Depression; Meta-worry; COVID-19.

Introduction

The International Health Regulations [World Health Organization (WHO), 2005, p. 9] states that a Public Health Emergency of International Concern (PHEIC) means an extraordinary event that "(i) constitutes a public health risk to other countries due to the international spread of diseases and (ii) potentially requires a coordinated international response." Considered the highest level of alertness by the WHO, PHEICs only occurred before during the H1N1 pandemic (2009), the international spread of the poliovirus (2014), the Ebola outbreaks (2014 and 2018), and the increase in cases of microcephaly and congenital malformations caused by the Zika virus (2016) [Pan-American Health Organization (PAHO) & WHO, 2020].

Currently, the world is facing the sixth PHEIC with the outbreak of the new human coronavirus (PAHO & OMS, 2020). In total, there are seven human coronaviruses, three of which can cause severe respiratory tract infections: SARS-COV, MERS-COV, and the current SARS-COV-2, which causes COVID-19 (PAHO & WHO, 2020). Responsible for over one million deaths by early November 2020 (em 02/11: 1.204.003), COVID-19 has made countries around the world adopt isolation and social distancing measures to prevent further contagion and contain its progress, while effective forms of prevention and treatment are researched (Faro et al., 2020; PAHO & WHO, 2020).

Widespread outbreaks of infectious diseases, such as COVID-19, are associated with psychological distress and symptoms of mental illness. Most existing studies were conducted in China, the first epicenter of the pandemic as we write, and observed mainly anxiety disorders such as common mental disorder (CMD) associated with COVID-19 occurrence in different countries (Huang & Zhao, 2020). In this sense, evidences from previous studies on events similar to COVID-19, such as MERS-COV and SARS-COV, show that measures to separate and restrict the flow of people have a massive impact on mental health, causing negative psychological outcomes such as CMD (Brooks et al., 2020; Jiloha, 2020). Symptoms of stress, irritability,

insomnia, post-traumatic stress disorder, depression, anxiety, substance abuse, suicide attempts, and self-injury behaviors are frequently observed in health care professionals and in the general population who, in this type of stressful situation, worry about uncertainties regarding the future, intensely fear of the risks of contagion and death (Brooks et al., 2020; Faro et al., 2020). In a study including 1210 participants, higher rates of anxiety and depression were associated with women, students, people with symptoms suggestive of COVID-19, and those with poor health perceptions, while availability of information and engagement in preventive behaviors such as washing hands seemed to soften these effects (Wang et al., 2020).

People with suspected COVID-19 were more likely to have depressive symptoms and lower quality of life than those without the disease (Nguyen et al., 2020). Regarding anxiety, its concept is based on a tripartite structure formed by worry, fear, and uncertainty, which are present in the current pandemic situation (Barari et al., 2020; Dong & Bouey, 2020; Faro et al., 2020; Kong et al., 2020). The current context is marked by the experience of uncertainty in terms of an effective vaccine or treatment of COVID-19 and expectations regarding the end of this pandemic. Simultaneously, there is fear of contagion, of death itself or death of significant ones, besides social isolation. Finally, the third facet of anxiety is fueled by worry about what is expected for the post-pandemic future.

In the domain of worry, metacognitive processes play an important role, since they contribute, correct, assess, and regulate thoughts, besides being closely connected to the development and maintenance of psychological disorders (Dinis & Gouveia, 2011). Generally, high levels of worry can trigger different psychiatric symptoms, many of them related to common mental disorders, for instance anxiety or depression. During the COVID-19 outbreak, exposure to information by the media may trigger both unrealistic optimism and negative thoughts, which can accentuate distorted predictions about health or even exaggerated worrying

(Faro et al., 2020). In this sense, studies investigating relations between worries and mental health have shown that outcomes related to anxiety and depression are common in contexts where there is excessive worrying (Huang & Zhao; 2020; Topper, Emmelkamp, Watkins, & Ehring, 2017).

The ongoing pandemic of COVID-19 is inducing fear, uncertainty, and worry, which lead to the need for a timely understanding of the repercussions on people's health status and psychological adjustment. In Brazil, for instance, no information has yet been found on the psychological impact and mental health of the general public in the initial period of the COVID-19 epidemic, which corresponded to March 2020 (Duarte, Santo, Lima, Giordani, & Trentini, in press). This is especially relevant due to the uncertainties surrounding an outbreak of incomparable magnitude in recent history, which makes it pertinent to understand how this situation has affected the mental health of the population at the beginning of the period of social isolation and quarantine due to COVID-19. Based on information from that initial moment, possibly more effective actions can be undertaken with a preventive character or even better structuring of health care throughout the crisis.

This study aimed to analyze the associations between meta-worry and symptoms of anxiety and depression in the face of the COVID-19 pandemic. Data collection was conducted in the initial period of the recommendation of social isolation and quarantine for suspected and confirmed cases in Brazil, in March, 2020. To do so, initially the occurrence of anxious and depressive symptoms was estimated. Then, the mean of the meta-worry score was calculated. Finally, we tested a predictive model in which meta-worrying explains the variability of anxiety and depression symptoms in the population.

Method

Participants

A total of 2042 Brazilians, of both sexes, aged between 18 and 78 years, participated in the study at late March 2020. The sample comprised mainly individuals located in the Northeast region (80%, *n* = 1634), with 14.1% (*n* = 288) in the Southeast, and 5.9% (*n* = 120) in other regions of the country. Specifically, in relation to the Northeast region, 74.6% of the individuals (*n* = 1219) lived in Sergipe. The sampling used was non-probabilistic, by convenience, and via online collection. The only inclusion criterion set was age over 18 years.

In the State of Sergipe, which makes up most of the sample, the government decree showing the public health emergency situation was issued on March 17. For the Southeast region, which concentrated the second largest part of the sample, the state of São Paulo decreed it on March 20, the state of Minas Gerais on March 15, the state of Rio de Janeiro on March 16, and the state of Espírito Santo, on March 17. For the other regions, dates varied between March 16 and 19.

Instruments

A sociodemographic questionnaire was used with the variables: sex (male or female), age (in years), skin color (white, black or brown; yellow and indigenous were excluded of the final sample due to small occurrence in the sample), education (up to high school or higher education), living alone (no or yes), chronic disease (no or yes), income (with or without steady income), health perception (ill or healthy), municipality and State of living (place of residence).

The worry levels were assessed using the Meta-Worry Questionnaire (MWQ), developed by Wells (2005). The Portuguese version of the MWQ was adapted and validated by Dinis and Gouveia (2011), with good internal consistency ($\alpha = 0.89$). The instrument includes seven items, in the form of questions, assessed separately on two scales that assess the frequency of metacognitions about worry and the degree of beliefs related to them. In the present study, only

the scale that evaluates the frequency of worry was used, due to the intention to conduct a brief mental health screening and, therefore, the need for the smallest possible research instrument. Answers are obtained using a 4-point Likert scale, ranging from "never" (1) to "always" (4). The score is obtained by adding the answers of all items, indicating that the higher the frequency of worry, the greater the probability of being dysfunctional. In this investigation, the instrument showed high internal consistency (Cronbach's alpha [α] = 0.90).

To identify the existence of symptoms of anxiety and / or depression, we used the 4-item version of the Patient Health Questionnaire [PHQ-4], Portuguese version, developed by Kroenke, Spitzer, Williams, and Löwe (2009). In the initial study, the instrument showed good internal consistency (α = 0.75). The PHQ-4 is a ultra-short screening questionnaire that assesses the frequency of symptoms of anxiety and / or depression over the preceding two weeks, with responses scored on a 4-point Likert scale, ranging from "never" (1) to "almost every day" (4). The total score is obtained by the separate sum of the responses of the items referring to the symptoms of anxiety ("feeling nervous, anxious or very tense" and "not being able to prevent or control worries") and depression ("feeling down, depressed, or without perspective" and "little interest or little pleasure in doing things"), where a score of three indicates significant signs of anxiety and / or depression disorders. In the current study, we applied a cutoff at score three because this survey just aimed screening significant symptomatology of anxiety or depressive disorders. The PHQ-4 had satisfactory reliability in this research (α = 0.84).

Procedures and Ethical Aspects

Data collection was conducted using an invitation sent via social networks, mainly Facebook and Instagram. The research was approved by CONEP, the National Research Ethics Committee, under approval number [omitted for evaluation]. The online questionnaire was directed to the general population and the public was asked to forward the survey to other people

in their social life. A Free and Informed Consent Form was located at the beginning of the questionnaire, which could only be completed if the individual agreed to participate. In order to be a short screening, the average response time was 5 minutes, according to the automatic registration of the platform used for data collection.

Data analysis

The data adjustment and analysis procedures were performed using the SPSS (*Statistical Package for Social Sciences*, version 23). The final scores of the instruments were obtained with descriptive analyses (absolute and percentage frequency, mean, and standard deviation). Four Binomial Logistic Regression models (Backward LR method) were used to estimate the effects of the independent variables sex, skin color, education, living alone, having chronic illness, age (categorized by quartiles in up to 24 years, 25-30 years, 31-39 years, and over 39 years), income, health perception, and meta-worry (dichotomized by the mean in above the mean and up to the mean) towards symptoms of anxiety and depression.

The PHQ-4 screening diagnoses were categorized by combining the presence of a single or simultaneous diagnosis (i.e. four groups: anxiety, depression, just one or both diagnosis). Thus, each group was used as a dependent variable (presence or absence of symptoms) in separated four logistic regression models. In the evaluation of each model, the following indicators were observed: Omnibus test (expected to be statistically significant), Nagelkerke's R^2 (the higher the better, corresponding to the explained variance of the final model), the Hosmer-Lemeshow test (expected not to be statistically significant), and correct predictive capacity of the model (expected around 70%). The multicollinearity assessment was performed for all models and no problems were found in the composition or final solution of the models. It is worth noting that all Odds Ratio (*OR*) values below 1 were converted by the formula 1/*OR* for purposes of

standardizing the description of the findings. Significance was set at $p < 0.05$ for all steps of binomial and multinomial regressions.

Results

Sample profile

The sample consisted of 75.9% (*n* = 1549) female participants and 24.1% (*n* = 493) male, with a median age of 30 years, of which 28.5% (*n* = 582) were aged up to 24 years, 23.6% (*n* = 482) were between 25 and 30 years old, 23.1% (*n* = 472) were between 31 and 39 years old, and 24.8% (*n* = 506), over 39. Regarding skin color, 45.5% (*n* = 929) declared to be brown, 44.1% (*n* = 900) white, and 10.4% black (*n* = 212). Most participants (87.7%; *n* = 1790) did not live alone, that is, shared their residence with someone (family member or friend). Regarding education, 82.8% (*n* = 1691) had a higher education degree (completed or students) and 17.2% (*n* = 351) up to a secondary education level. Regarding income, 72.6% (*n* = 1483) had steady income, and 27.4% (*n* = 559) declared they did not have it. Most participants perceived themselves as healthy (81.4%; *n* = 1662) and only 18.3% (*n* = 373) declared to suffer from some chronic disease.

On the meta-worry scale (*Mean* [*M*] = 12.5, *Standard Deviation* [*SD*] = 4.90), 41% (*n* = 837) of the participants scored above the mean, and 59.0% (*n* = 1205) scored values up to the mean. As for anxiety or depression symptoms (cutoff at score three), 36.2% (*n* = 739) had symptoms suggestive of anxiety, 24.8% (*n* = 506) had symptoms suggestive of depression, 42.8% (*n* = 873) had symptoms suggestive of just one diagnosis (anxiety or depression), and 18.2% (*n* = 372) had both. In the full sample, 57,2% (*n* = 1169) of the participants did not show significant symptoms for anxiety and/or depression.

Logistic Regressions

Four binomial logistic regressions were performed, one for each of the PHQ-4 outcomes and another two for the possible combinations of these outcomes. Table 1 shows the results of

each model, as well as their adjustment indicators, which were all satisfactory, with high predictive capacity and explained variance. It was found none multicollinearity issues between the variables in all models. Regarding the first model, related to anxious symptoms, younger people (up to 24 years old) showed 1.6 more chances of having symptoms than those over 39 years old (*OR* = .6; 1/*OR* = 1.5). Individuals who reported not having a steady income were more likely to have anxious symptoms than those who had a steady income (*OR* = 1.4), and those who perceived themselves as ill also showed more chances of having symptoms suggestive of anxiety than those who perceived themselves as healthy (*OR* = 2.1). The meta-worry variable showed that those who scored above the mean had a 12-fold higher chance of having anxious symptoms than those who scored up to the mean (*OR* = 12.0).

In the outcome related to depressive symptoms (second model), younger people (up to 24 years old) showed more chances of having symptoms in relation to all age groups of older people: in relation to those between 25 and 30 years old, they showed 1.6 more chances (*OR* = 0.6; 1/*OR* = 1.6), in relation to those who were between 31 and 39, they had two times more chances (*OR* = 0.5; 1/*OR* = 2), and in relation to those who were over 39, they had 2.5 times more chances (*OR* = .4; 1/*OR* = 2.5) of presenting depressive symptoms. Those who perceived themselves as ill were 2.5 times more likely to have depressive symptoms than those who perceived themselves as healthy (*OR* = 2.4). Those who declared living alone were about 1.5 times more likely to have depressive symptoms than those who did not live alone (*OR* = 1.4). Regarding meta-worries, those who scored above the mean on the scale showed approximately 6.5 more chances of symptomatology suggestive of depression than those who scored up to the mean (*OR* = 6.6).

In the third model, related to the outcome of just one diagnosis (anxious or depressive symptoms), the youngest (up to 24 years old) showed 1.5 more chances of having one of the

symptomatologies compared to those between 31 and 39 years old (*OR* = 0.7; 1/OR = 1.4), and two times more chances compared to those over 39 (*OR* = 0.5; 1/OR = 2). Regarding income, those who did not have a steady income showed more chances of having any of the set of symptoms compared to those who had a steady income (*OR* = 1.3), as well as those who perceived themselves as ill in relation to those who perceived themselves as healthy (*OR* = 2.4). Those who scored above the mean on the meta-worry scale were about 11.5 times more likely to have symptoms suggestive of anxiety or depression than those who scored up to the mean (*OR* = 11.4).

Finally, in the outcome related to having both set of symptoms (fourth model), those who were up to 24 years old were two times more likely to present them in relation to both the group between 31 and 39 years old and in relation to those who were over 39 years old (*OR* = 0.5; 1/*OR* = 2). Not having a steady income and perceiving oneself as ill increased the chances of having anxious and depressive symptoms in relation to those having a steady income (*OR* = 1.3) and who perceived themselves as healthy (*OR* = 2.4). Those who scored above the mean on the meta-worry scale were about 13 times more likely to have both set of symptoms than those who scored up to the mean (*OR* = 12.7).

Table 1

Indicators of Binomial Logistic Regressions for symptoms of anxiety and depression in the PHQ-4

Binomial Regressions		Odds Ratio (OR)	1/OR	p-value
Anxiety[1]				
Age	Up to 24 years	1	-	-
	Above 39 years	0.6	1.6	0.005
Income	With steady income	1	-	-
	Without steady income	1.4	-	0.002
Health	Healthy	1	-	-
	Ill	2.1	-	< 0.001
Meta-worry	Up to the mean	1	-	-
	Above the mean	12	-	< 0.001
Depression[2]				
Age	Up to 24 years	1	-	-
	Between 25 and 30 years	0.6	1.6	0.003
	Between 31 and 39 years	0.5	2	< 0.001
	Above 39 years	0.4	2.5	< 0.001
Health	Healthy	1	-	-
	Ill	2.4	-	< 0.001
Living alone	No	1	-	-
	Yes	1.4	-	0.044
Meta-worry	Up to the mean	1	-	-
	Above the mean	6.6	-	< 0.001
Anxiety or depression[3]				
Age	Up to 24 years	1	-	-
	Between 31 and 39 years	0.5	2.0	0.013
	Above 39 years	0.5	2.0	< 0.001
Income	With steady income	1	-	-
	Without steady income	1.3	-	0.019
Health perception	Healthy	1	-	-
	Ill	2.4	-	< 0.001
Meta-worry	Up to the mean	1	-	-
	Above the mean	11.4	-	< 0.001

Anxiety and depression[4]				
Age	Up to 24 years	1	-	-
	Between 31 and 39 years	0.5	1.8	0.001
	Above 39 years	0.5	1.9	< 0.001
Income	With steady income	1	-	-
	Without steady income	1.3	-	0.038
Health perception	Healthy	1	-	-
	Ill	2.4	-	< 0.001
Meta-worry	Up to the mean	1	-	-
	Above the mean	12.7	-	< 0.001

Notes.

* Variables without statistical significance in each model were excluded from the Table.

1. Outcome anxiety symptomatology: Omnibus test = 692.120 ($p < 0.001$). Hosmer-Lemeshow Test $X^2 = 2.408$ ($p = 0.966$). Nagelkerke's $R^2 = 0.394$ (39.4%). Percentage of cases correctly predicted = 78.6%.

2. Outcome depression symptomatology: Omnibus test = 433.151 ($p < 0.001$). Hosmer-Lemeshow Test $X^2 = 9.343$ ($p = 0.229$). Nagelkerke's $R^2 = 0.284$ (28.4%). Percentage of cases correctly predicted = 77.5%.

3. Outcome anxiety or depression symptomatology: Omnibus test = 719.579 ($p < 0.001$). Hosmer-Lemeshow Test $X^2 = 1.543$ ($p = 0.992$). Nagelkerke's $R^2 = .399$ (39.9%). Percentage of cases correctly predicted = 78.2%.

4. Outcome anxiety and depression symptomatology: Omnibus test = 475.575 ($p < 0.001$). Hosmer-Lemeshow Test $X^2 = 6.481$ ($p = 0.594$). Nagelkerke's $R^2 = .339$ (33.9%). Percentage of cases correctly predicted = 83.3%

Discussion

The present investigation aimed to examine associations between meta-worry and significant anxious and/or depressive symptoms in the Brazilian people during the beginning of the COVID-19 pandemic. It is noteworthy that all models had an excellent outcome, with explained variance relatively high, around 40%, in addition to high values of correctly predicted cases. Consistency of the explanatory variables was also observed, which did not have much variation depending on the outcome. In this sense, it was found that there are basic characteristics that predicted the greatest predisposition to presenting symptoms of anxiety and depression related to age, steady income, perception of health, and meta-worry. Exceptionally, living alone was a significant explanatory variable only for depression.

Regarding age, we observed that the chance of younger people presenting symptoms in all outcomes was higher. In all models evaluated, the group of those who were up to 24 years old was more vulnerable to anxious and / or depressive symptoms at the time of collection. It is noteworthy that younger people generally have less experience in relation to different psychosocial stressors when compared to older people, and some of these stressors seem to be aggravated in the current pandemic scenario. As an example, the younger you are, the more likely you are to be at the beginning of your professional career and still looking for financial stability, which increases the probability of not having a steady or regular income either (Huang & Zhao, 2020; Liu, Zhang, Wong, & Hyum, 2020), and a steady income was also a variable present in all outcomes (except in depression, isolatedly). It is also worth noting the current findings come up in a scenario of 2 months after the start of the adoption of quarantine and social distance measures (period of the data collection); in another words, a situation in which stressors related to unemployment and income were already feared and shared socially.

Another important variable was the perception of health. Results showed that those who perceived themselves as ill showed a higher probability of having symptoms of anxiety and / or depression. In other words, participants who already had some level of previous health issue or vulnerability seem, on average, to have twice the chance of developing some symptoms of anxiety or depression. Due to the daily stress related to the day-to-day life of the pandemic - to which they had already been exposed for 2 months - at the beginning of the confinement those individuals who declared their perception of health as deteriorated may have already had some differentiated vulnerability. Poor health perception was associated with higher rates of depression and anxiety during the COVID-19 pandemic also in other studies (Wang et al., 2020), especially if the perception of illness is related to the suspected contagion by the coronavirus (Nguyen et al., 2020), which reinforces the consonance of this finding with previous evidence.

The variable living alone, which can refers to the perception of less social support, increased the chances only for depressive symptoms only. On this, the literature shows that individuals who live alone are less likely to share worries and fears throughout the pandemic, except through devices (Jacob, Haro, & Koyanagi, 2019; Stahl, Beach, Musa, & Schulz, 2017). Then, it seems plausible to think that, if affected by COVID-19, these individuals seem to have less perception that they would eventually obtain support to deal with the disease.

Finally, it was detected that the main explanatory variable of this study was meta-worry, which considerably increased the chances of symptoms in the 2 possible outcomes, reaching almost 13 times more chances for the presence of symptoms of anxiety and depression, simultaneously. In terms of diagnosis, meta-worry is a key element for anxious symptoms and in the context of the current pandemic the scenario itself is conducive to the development of different worries, there is the fear of contagion, of death itself or of loved ones, in addition to imposed social isolation (Liu et al., 2020). In this regard, outcomes related

to the symptoms of anxiety and depression are common in contexts associated with excessive meta-worrying (Topper et al., 2017) and studies already show vulnerability to these conditions in people who spend a considerable amount of time with cognitions related to the pandemic (Huang & Zhao, 2020). During epidemics, the number of people whose mental health is affected tends to be greater than the number of people affected by the disease and tends to outlast the epidemic itself (Shigemura, Ursano, Morganstein, Kurosawa, & Benedek, 2020), which brings to the agenda, in the Brazilian context, the topic of excessive worrying.

As limitations of the present study, the sample is not directly generalizable, given its non-randomization; however, its size helps to provide greater reliability to the findings and increases the likelihood of replicability. The results were obtained mainly in the Brazilian Northeast and with groups with specific demographic characteristics, i.e. women and high level of scholarity. Furthermore, although meta-worry is an important explanatory variable, other potentially important mediators were not measured, such as tolerance to anxiety and coping strategies, making it impossible to investigate whether, even with a high level of worry, such variables would mitigate the chance of belonging to positive groups. Thus, it is suggested that future studies include mediators in the analysis in order to better understand the predictive capacity of meta-worry in anxiety and depression. In addition, considering the different phases of social isolation and consequences of the pandemic, it is pertinent that longitudinal studies monitor its impact on the mental health of individuals during and after the pandemic.

Finally, given the current global scenario, which is quite critical and has an unknown impact, particularly in Brazil, the importance of monitoring the mental health of the Brazilian population is emphasized. Therefore, we believe that research and interventions aimed at relieving psychological suffering are essential and should be part of the public health policy proposal to fight COVID-19 in the present and in the long term.

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Contribution of each author

André Faro – Contributed significantly to the manuscript, provided oversight and guidance on statistical analysis.

Luana Cristina Silva-Santos – Performed all statistical analysis, provided the data, and wrote the manuscript.

Maisa Carvalho Silva – Contributed significantly to the analysis and wrote the manuscript.

Matheus Macena Vasconcelos - Contributed significantly to the analysis and wrote the manuscript.