Original article

Is social distancing a boon or bane for persons who stutter during COVID-19 pandemic?

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ABSTRACT

The Covid-19 pandemic is an ongoing crisis and is colloquially known as the corona virus pandemic. As no specific treatment protocol are available for this viral infection, social distancing is considered as one of the remedies to prevent the infection. This study aimed to investigate the anxiety issues in persons who stutter (PWS). A total of 110 (55 PWS and 55 Neuro-typical Adults) were enrolled for the study. A questionnaire comprising of two parts on social anxiety and consequences of social distancing was administered on the participants. The results showed that PWS felt more socially anxious. PWS opined that they were comfortable during the corona virus lockdown period, as the situation demanded them to speak minimally to strangers. Neuro-typical adults, on the other hand, reported that they did not observe any change with respect to the social communication skills during lockdown.

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1. Introduction

The COVID-19 pandemic is an on-going pandemic and is colloquially known as the CORONA VIRUS. It was initially identified in Wuhan, China, in the year 2019. It is caused by the Severe Acute Respiratory Syndrome Corona Virus 2, also called the Novel Corona Virus. The World Health Organisation called it as an outbreak in January 2020 and later named it a pandemic in March 2020, after the condition spread globally and affected a more significant number of individuals. The virus is known to have spiky projections on their surface resembling a crown. Corona means Crown in Latin; thus the virus is labelled as Corona virus. The corona virus has to capacity to transfer to human hosts and can cause illness (see Figs. 1–3).

Corona virus is one of the major pathogens that primarily target the human respiratory system. The common symptoms of CORONA include rhinorrhoea, sneezing, and sore throat, ever, cough, fatigue, and shortness of breath (Lee et al., 2003). While other symptoms include sputum production, headache, hemoptysis, diarrhoea, dyspnoea, and lymphopenia (Ren et al., 2020; Carlos et al., 2020). The

clinical features revealed through a chest CT scan may resemble that of pneumonia, this lead to the confusion in the diagnosis of CORONA when the condition emerged initially. Some features like RNA Anaemia and the formation of multiple peripheral ground-glass opacities were evident in sub-pleural regions that differentiated the condition from pneumonia. The gastrointestinal symptoms like diarrhoea were reported in few individuals.

The number of leukocytes is assumed to be more in individuals affected by CORONA, and the levels of plasma pro-inflammatory cytokines are also assumed to be more in the infected individuals. On sputum evaluation, it is revealed that the polymerase chain results confirmed the diagnosis of CORONA. In the affected individuals, a higher erythrocyte sedimentation rate is seen.

As far as the transmission of CORONA is concerned, it is often agreed that similar to the other respiratory infections, CORONA is also assumed to be transmitted through droplets of different sizes. The respiratory droplets of the size greater than 5–10 μm in diameter are known to transmit the virus. The symptoms of CORONA may not be seen immediately after the person contracts infection. The symptoms start to manifest after the incubation period, which is assumed to be around 5.2 days. (Li et al., 2020). The period from the onset of CORONA symptoms to death ranged from 6 to 41 days, with a median of 14 days (Wang et al., 2020). This period is individualistic and is dependent mainly on the age of a given individual and immunity. A study done in this regard (Wang et al., 2020) showed that the period was shorter in individuals above 70 years compared to those below 70.
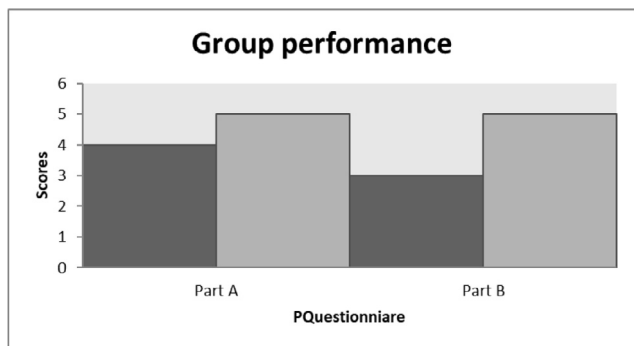
Fig. 1. Median Values for Group 1 and Group 2 on Part A and Part B of the questionnaire.

Fig. 2a. Comparison of performance across age for Part A of the questionnaire.

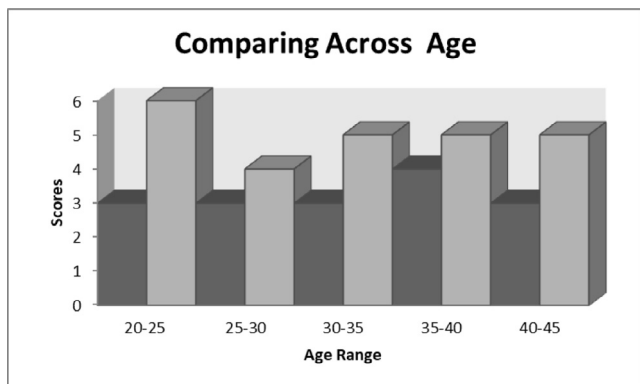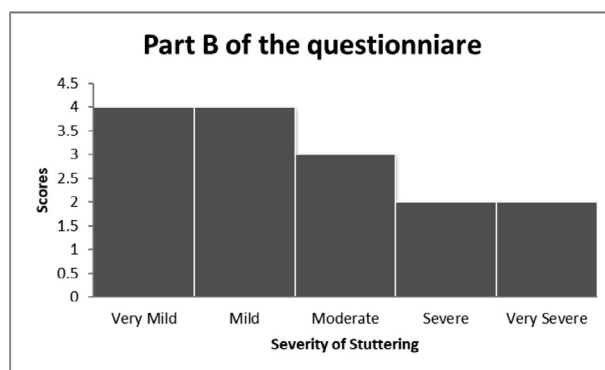**Fig. 2b.** Comparison of Performance across Age for Part B of the questionnaire.

Fig. 3a. Performance across the severity of stuttering for Part A of the questionnaire.
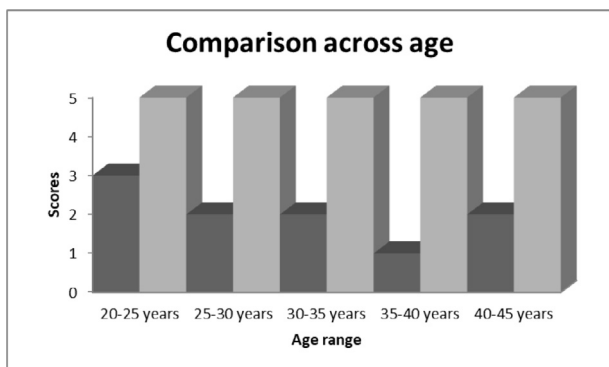

Fig. 3b. Performance across the severity of stuttering for Part B of the questionnaire.

The outbreak and symptoms is similar to Severe Acute Respiratory Syndrome and Middle East Respiratory Syndrome. In SARS, the transmission is assumed to Zoonatic transmission (transmission from animal to human). However, the mode of transmission is assumed to be unclear in the case of CORONA. The stability of CORONA is assumed to be the same as SARS. However CORONA may spread more quickly compared to SARS. The viral load could be more in CORONA compared to SARS owing to which the transmission may be easier in the former compared to the latter. The other major difference is that SARS is known to transmit from symptomatic individuals to others, while CORONA can spread from individuals who are asymptomatic also. These factors distinguish CORONA from SARS. However, more studies have to be carried out in this regard to understand about CORONA better.

Antiviral drugs are used in the treatment of these individuals. The treatment strategies are assumed to be individualistic, and are known to vary from one place to another and from one medical practitioner to another. Till date, no specific treatment is available for the CORONA infection and it must be acknowledged that several groups of scientists are currently working hard to develop a specific line of treatment and vaccines. As vaccines are currently unavailable in mass, social isolation and distancing are advised for all the individuals to reduce the risk in contracting the infection, and the concept of lockdown is followed in many countries to limit the spread. Social isolation is suggested in the affected individuals as they are prone to spread the infection to others. The current study tries to view the concept of social distancing in the eyes of persons who stutter(PWS).

Many theorists and clinicians have proven that stuttering is associated with anxiety. While few researchers speculate that anxiety would cause an emotional reaction in stuttering, few others assume that anxiety is a consequence of stuttering. The dysfluencies such as repetitions, prolongations, and pauses seen in stuttering may be seen even in individuals without stuttering also. These symptoms may be seen under communicative pressure or in situations evoking anxiety. The quantum of difficulty may be more in the former than the latter. Perhaps this is why stuttering is believed to be caused by anxiety or negative emotions. Some researchers, on the other hand, believe that anxiety can be a predisposing, precipitating and persisting factors in the case of stuttering (Janssen, 1994; Menzies et al., 1999).

There are few studies (Janssen and Kraaimaat, 1980; Kraaimaat, 1980; Peters, 1987; Peters and Hulstijn, 1984) which compares PWS with non stutters, in regard to anxiety and it is inferred that even though the emotional threshold may not be low in PWS , it is

agreed that negative emotions may be more in PWS compared to controls.

Persons who stutter may avoid speaking in some situations. Hesitation and avoidance in speaking are some common reactions adapted by PWS to cop up with the problem. It is often employed while speaking to strangers as they may have an intention to hide the fact that they have such a problem or may even think that the person may ridicule or look down as he/she has stuttering. The present study was carried with the premise that PWS may have a different perspective about the social distancing.

Aim of the study: The study aims at investigating the perspective of PWS and persons with no stuttering (PWNS) on social anxiety and social distancing.

2. Methods

2.1. Participant details

A total of 110 participants were recruited for the study based on convenient sampling. The participants were divided into two equal groups on the basis of presence or absence of stuttering. The first group comprised of 55 participants (37 males and 18 females). The age of the participants ranged from 20 to 42 years. They were all natives of Saudi Arabia.

The participants in this group were diagnosed to have stuttering. Diagnosis was done by a qualified speech language pathologist and these participants were receiving treatment before the outbreak of pandemic. The detail of the participants is shown in Table 1. All the participants in this group worked in different offices, shopping malls and public sector. In order to ensure homogeneity business men were not considered for the study. As the study was carried out immediately after the call of lockdown, work from home culture had not started yet. However they were in minimal contact with their employer through phone calls etc.

As seen in Table 1, there were more participants in the age range of 20–25 years compared to the other age groups. There were only 2 participants in the age range of 30–35 years, and there was a single participant between 40 and 45 years. There were more male participants than female participants regardless of the age.

Further Stuttering Severity Instrument IV (SSI-IV) was administered on the participants and the participants were sub-grouped based on the severity as estimated by this test. Stuttering severity instrument is abbreviated as SSI. The test is modified and revised over the years, and is used for diagnostic purposes. It is considered a reliable and valid assessment tool, which can be used in children as well as adults. The test has four areas of speech behaviour namely frequency, duration, physical concomitants and naturalness. Frequency is expressed in terms of syllables stuttered and is converted to a scale scores of 2–18. Duration is rounded to the nearest one tenth of a second and is converted to a scale score of 2–8. The physical concomitant score also is converted to a scale score of 0–20. Administration of this test on group 1 participants led to sub grouping based on severity as assessed by the test. As shown in Table 2 (below), the group 1 participants were further

Table 1
Distribution of Group 1 participants.

	Number of participants		Total
	Males	Females	
20–25 years	18	6	24
26–30 years	12	8	20
31–35 years	6	2	8
36–40 years	2	0	2
41–45 years	1	0	1
	39	16	55

divided into 5 sub-groups. There were more participants in the moderate stuttering severity group followed by mild, severe, and very severe stuttering groups. There were no participants in the very mild severity group.

The second group (group 2) comprised of 55 neuro typical participants. The participants in this group did not have any history of communication disorders or neurological anomalies. These participants were age and gender matched with group 1 participants. The participants in this group were also selected on the basis of convenient sampling and they also carried out the same kind of professions as the participants of the other group.

Further a questionnaire was administered on the participants. The questionnaire consisted of two parts. The first part of questionnaire tapped details about the situations evoking anxiety in PWS . While the second part of the questionnaire tapped the perspective of PWS about social distancing.

2.2. Materials and procedure

As stated earlier, the first part of the questionnaire consisted of 10 questions. The questions were framed in such a way that they were close-ended and the questions elicited details regarding the situations evoking anxiety. The first two questions targeted the interaction of PWS with familiar people and strangers in the surrounding or home environment. The participants were asked to express if they found it difficult to handle these situations. The next two questions asked the participants if they confronted difficulty while speaking to friends and family members. While the first two questions targeted interaction with third person or strangers the next two questions interrogated the participants regarding their interaction with family members or friends.

The following two questions required the participants to report if they had difficulty while receiving phone calls from known and unknown numbers, respectively. The next two questions attempted to question the participants if they experienced difficulty in speaking to people in commercial places (including therapy situations for PWS ; only commercial places like mall, saloon and other places for participants of group 2). The last two questions tapped details regarding the problems experienced by PWS in office. One of these two questions required the participants to report if they are comfortable when their boss called them to the chamber. The other question questioned the participants if they were comfortable while speaking to new people, who they get introduced as a part of their job.

The second part of the questionnaire had 6 questions. The first question asked the participants if they were comfortable during the CORONA crisis as there was less room for social communication (as the lockdown period demanded them to speak to relatively fewer people, especially strangers in their surroundings and office respectively, these questions were coined). The second question asked the participants if they reduced social interaction as a consequence of social distancing. The third question asked the participants if they were comfortable while receiving phone call (This question was formulated as the chances of receiving the phone calls was relatively less during the COVID-19 crisis). The fourth question was about the office situation, where the participants were asked if they felt better as their boss would not call them to his/her situation anymore. The fifth question was set to know if the participants (persons who stutter) felt better that they were no longer exposed to strangers as a part of their job. The sixth question tried to tap the perspective of PWS about lockdown, where they were asked to opine if the decision to impose lockdown was correct or wrong. The question was deliberately kept subjective to tap the perspective of PWS especially. The questionnaire was again administered after a lapse of one week's time on 20 par-

Table 2
Distribution of group 1 participants according to the severity of the problem.

	20–25 years	26–30 years	31–35 years	35–40 years	40–45 years
Very Mild Stuttering	0	0	0	0	0
Mild Stuttering	4	3	2	0	0
Moderate Stuttering	9	11	6	0	1
Severe Stuttering	11	5	0	1	0
Very Severe Stuttering	0	1	0	1	0

ticipants who stutter and 15 neuro typical participants to know the internal consistency.

Content validity: As the questionnaire is a non standardised one, the questionnaire was circulated to three speech language pathologists, who were asked to suggest their opinion on the content of the questionnaire. All the three speech language pathologists were experienced and were working with PWS . The three speech language pathologists opined that the questions were relevant and suggested rephrasing of few questions. These changes were incorporated in the final questionnaire circulated to the participants few questions.

2.3. Analysis and scoring

The intended answer for each question was taken into consideration, a score of 0 was given when the given response did not match with the intended response and a score of 1 was given when the given response and the intended response matched (Khan et al., 2019).

3. Results

The responses provided by Group 1 and Group 2 participants were computed and analysed for the first and second part of the questionnaire individually. The responses provided by participants in group 1 were also analysed in regard to the age and severity of stuttering (within the sub groups of group 1). The internal consistency of the questionnaire was also estimated.

3.1. Section I: between group analysis

In this section of results, group 1 was considered as a whole group, the performance of this group was compared with the performance of group 2 on the first and second part of the questionnaire. The first part of the questionnaire had 10 questions while the second part of the questionnaire had 6 questions. The intended response for the first part of the questionnaire was 'No' as it is expected that the participants would not confront any difficulties in handling the situations specified in the questionnaire. The second part of the questionnaire required the participants to report on the changes observed during the lockdown period. The intended response was 'No' again as it is expected that the participants should not experience any changes pre and post lockdown. When the intended response and the response provided by the participants matched a score of 1 was given and a score of 0 was given when there was disparity between the expected and observed/-given response. The scores obtained by participants of group 1

and group 2 on the first and second part of the questionnaire are tabulated in Table 3.

In order to verify if there was any statistically significant difference between the two groups, Mann Whitney U test was carried out as the data was non parametric (as proven by Shapiro Wilk's test of normality, which showed a p value of <0.05 indicating that the data did not abide by the properties of normal distribution). The Z value obtained on comparison was 3.22 for the first part of the questionnaire and the Z scores was 2.78 for the second the second part of the questionnaire the corresponding p values ($p < 0.05$) showed significant difference between Group 1 and Group 2 participants.

3.2. Section II: within group analysis

The scores on the first and second part of the questionnaire were analysed with respect to two variables (age and degree of stuttering). While analysing the performance, across ages, degree of stuttering was kept as constant, and while analysing the performance across severity, the age was kept independent (constant), as shown in Table 4.

3.3. Analysis across age

In order to verify if there was any significant difference between the age groups, Kruskal Wallis Test was administered. For group 1, the X^2 value for part A and part B of the questionnaire were 1.12 and 0.96 and the corresponding p value did not show any significant difference. For Group 2, the X^2 for the two parts was 1.33 and 0.976 and the corresponding p value showed no significant difference. Thus, it can be inferred that the performance did not vary as a function of age. Further, within group analysis was carried out, considering the severity of stuttering and holding age as a constant.

As seen in Table 5, the performance varied as a function of severity of stuttering. This was true for both parts of the questionnaire. Kruskal Wallis test was administered again and the X^2 value obtained was 2.66 and 1.32 and the corresponding p values showed significant difference only for the first part of the questionnaire, further Mann Whitney U test was used to verify pair-wise difference and the Z score obtained showed significant difference when the very mild and mild groups were compared with severe and very severe stuttering groups, thus showing that the performance varied with respect to severity. The performance did not vary with respect to the severity of stuttering for the second part of the questionnaire indicating that the perspective on social distancing did not vary as a function of severity (see Table 6).

Table 3
Comparing the Median values for group 1 and Group 2.

	Group 1 Median scores	Quartile Deviation At 75th Quartile	Group 2 Median scores	Quartile Deviation At 75th Quartile
Part A of the questionnaire (Max score of 10)	4	1.5	5	1.98
Part B of the questionnaire (Max score of 6)	3	1.75	5	1.36

Table 4
Performance as a function of age.

			20–25 years	26–30 years	31–35 years	35–40 years	40–45 years
Part A of the questionnaire (Max score 10)	Group 1	Median scores	3	3	3	4	3
		QD	1.33	1.28	1.44	0.98	0.87
	Group 2	Median scores	6	4	5	5	5
		QD	1.33	1.17	1.01	1.05	1.22
Part B of the questionnaire (Max score 10)	Group1	Median scores	3	2	2	1	2
		QD 75th Quartile	1.27	1.01	1.77	1.36	1.17
	Group 2	Median scores	5	5	5	5	5
		QD 75th Quartile	1.16	0.89	1.22	1.14	1.17

Table 5
Performance as function of severity of stuttering for Group 1.

		Very Mild Stuttering	Mild Stuttering	Moderate Stuttering	Severe Stuttering	Very severe Stuttering
Part A of the questionnaire (Max Score 10)	Median	5	6	4	3	2
	QD 75th Quartile	2.31	1.98	1.86	1.22	1.47
Part B of the questionnaire (Max Score 6)	Median	4	4	3	2	2
	QD at 75th Quartile	1.36	1.27	1.34	1.66	1.34

Table 6
Internal consistency of the data.

	Group 1 α	Group 2α
Part A	0.98	0.93
Part B	1	0.91

4. Correlating the speech anxiety and perspectives on social distancing

The questionnaire used for the study had two parts. The first part of the questionnaire had 10 questions while the second part of the questionnaire had 6 questions. The first part of the questionnaire dealt with situations evoking anxiety while the second part of the questions dealt with changes post lockdown. As stated earlier this questionnaire was administered on two groups of participants, the first group comprised of PWS and the second group consisted of Neuro typical individuals.

The responses were scored on the basis of what was the intended response to the observed/given response. A score of 1 was given when these two scores matched, while a score of 0 was provided when there was mismatch between the provided response and intended response. Correlation was carried for the scores obtained on the two parts of questionnaire for each group separately.

For Group 1, Kendall Rank correlation coefficient was carried out and the correlation coefficient (Kendal Tau) for group 1 was 0.811, while two sided H1 dependence was 0.766. The correlation coefficient indicated that the scores on the two parts of the questionnaire correlated well, thus it can inferred that the anxiety exhibited varied linearly with the opinions on social distancing. In other words, person who stutter who exhibited more anxiety felt much better during the lockdown period as the situations were less demanding during this tenure. For group 2, the correlation coefficient (Kendal Tau) for group 1 was 0.411 and the H1 dependence was 0.318, the correlation coefficient was lesser for this group compared to the previous group.

5. Internal consistency

The questionnaire was administered twice on a subset of participants (20 from group 1 and 15 from group 2). The rationale of administering the questionnaire twice was that the internal consistency can be inferred from the data. Cronbach's Alpha was administered on the data separately for Part 1 and Part 2 and for group and group 2 and the alpha values are as shown in Table 5.

As seen in Table 5, α value were more for Group 1 compared to group 2. However the α values were more than 0.93 for both the groups showing that internal consistency was fairly good for the data subjected for testing.

6. Discussion

The questionnaire was divided into two parts. The first part of the questionnaire as discussed earlier had 10 questions while the second part of the questionnaire had 6 questions. The first part of the questionnaire consisted of 10 questions. The questions basically interrogated the participants regarding their interaction with familiar people, friends, family members and strangers (faced during day to day situations or therapy situations). The participants were also questioned if they faced difficulty while speaking in commercial places and speaking to customers. The participants were further questioned if they had any difficulty in receiving phone calls from known and unknown numbers. The participants were further questioned if they faced any difficulty in speaking to colleagues, boss and unknown people at office. The responses were coded as correct or wrong by comparing the responses provided by the participants with the intended response. In other words the responses were coded by comparing the provided responses with that of the intended responses.

It was observed that the PWS faced no difficulty while speaking to familiar people and friends. The same response was seen for neuro typical participants. As expected PWS faced difficulty in confronting strangers either in routine or in therapy situations. Interestingly even few of the neuro typical participants reported that they faced difficulty in handling such situations; however the question on confronting strangers in therapy situation was not applicable for neuro typical participants. PWS faced difficulty in receiving phone calls regardless of whether the call was from a saved or unsaved number. More number of participants reported that they had difficulty while receiving calls from unknown numbers. Neuro typical participants on the other hand faced no difficulty in receiving calls either from an unknown number or from a known number. PWS reported that they faced difficulty while speaking to their boss or strangers who they were required to meet

as part of their job. Few participants reported they had difficulty while speaking to their colleagues while few others reported no such problem, thus the response was mixed for this question. Neuro typical participants did not report any difficulty in speaking to colleagues or strangers but few of them reported anxiety while speaking to their boss. The same trend of responses was seen in all the participants regardless of their age. The difficulty confronted linearly varied with respect to the severity of stuttering. Participants with very mild stuttering, mild and moderate stuttering reported relatively lesser difficulty when compared to persons with severe and very stuttering. Owing to this, the participants diagnosed with stuttering scored more compared to neuro typical participants.

The second part of the questionnaire had 6 questions. The questions asked the participants if they were comfortable during the lockdown period as the situation required them to speak to relatively fewer people, especially strangers. The second question asked the participants if they reduced social interaction as a consequence of social distancing. The participants were further questioned on how they felt while communicating at office especially with the boss. The next question was set to know if the participants were comfortable in receiving calls during lockdown. The last question tapped details on the perspective of participants regarding lockdown. The last question was a very important one especially for PWS .

It was observed that the PWS were comfortable during the lockdown as the situation did not demand them to speak much in this situation (as observed on Kendall Tau's correlation coefficient). PWS felt good that the situation required them to speak less to strangers. PWS felt that the lockdown was a positive phenomenon Neuro typical participant reported no major change during the lockdown period.

From the results, it was clear that there was a statistically significant difference between PWS and neurologically healthy participants. This could because of the factor that PWS exhibited more marked difficulty in confronting social situations because of their anxiety issues. This finding is in consonance with similar studies carried out in the past (Janssen and Kraaimaat, 1980; Kraaimaat, 1980; Peters, 1987; Peters and Hulstijn, 1984). Statistically significant difference was seen between PWS and neuro typical adults on the second part of the questionnaire also indicating that the perspective of these individuals on social distancing was different. While PWS felt better during the lockdown period as there was no much necessity for them to communicate during the lockdown period, neuro typical participants felt no difference.

Within group analysis also revealed interesting details about social anxiety and social distancing. Considering age as a variable, statistically significant difference was not seen for the either groups on the two parts of the questionnaire this indicate that the views and perspectives did not vary as a function of age. Considering severity as variable for Group 1 the performance varied as a function of severity. Persons with greater severity of stuttering exhibited more difficulty than the participants diagnosed with milder severity of stuttering.

Further the correlation coefficient showed that the speech related anxiety showed a linear relationship with the difficulties exhibited during lockdown. Those individuals who experienced speech related anxiety felt better during the lockdown. This showed that the lockdown was boon for individuals who experienced speech anxiety. One more interesting point was that all the participants, regardless of whether they had stuttering or not) felt that the measure of imposing lockdown was correct; this showed a greater social responsibility on the part of the participants. However few participants felt that the impact of lockdown was not positive always as it decreased their economic viability.

7. Conclusions

The study aimed at investigating the perspective of PWS and neuro typical participants about social anxiety and social distancing. The first part of the questionnaire tapped details regarding social anxiety involved in handling the routine situations. As expected, participants who stutter confronted more difficulty. Findings on the second part (Part B of the questionnaire) revealed that participants who stutter felt that the environment post lockdown was facilitative. The limitation of the study was that the participants were not grouped on the basis of profession. This would have provided a better picture in understanding if the profession had a bearing on social anxiety and social distancing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgement

Funding

Availability of data and materials

All data that were generated or analysed during this study are presented in the manuscript. Please contact the corresponding author for access to data presented in this study.

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Further Reading

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