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ORIGINAL RESEARCH

Mental health outcomes due to COVID-19 pandemic on Anaesthesiologists: An observational cross-sectional study across Pondicherry

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ABSTRACT

Background: The frequent direct contact with patients and performing aerosol-generating procedures make Anaesthesiologists prone to risk during epidemics and pandemics. Government-imposed containment measures lead to social isolation and psychological distress.The primary objective was to assess mental health outcomes among qualified anaesthesiologists involved in COVID-19 care across Pondicherry, secondary objective was to assess the coping strategies used. **Methods:** We conducted an online observational, cross-sectional, single response study among qualified Anaesthesiologists who were actively involved in COVID-19 patient care across Pondicherry. After obtaining institutional ethical committee clearance, the voluntarily participating Anaesthesiologists were administered a Google forms-based closed-ended questionnaire via e-mail. Sociodemographic, workplace and perception characteristics were assessed. Mental status outcomes assessment was done using DASS-21 questionnaire and Coping Strategies Inventory – Short Form. **Results:** Among 118 respondents, the overall prevalence of depression, anxiety and stress was 38.9%, 41.6% and 18.6% respectively. Among those who participated in our study, 4.4%, 10.6% and 9% were found to have extremely severe (depression, anxiety and stress) respectively. Receiving a quarantine order was found to be statistically significant for depression ($P < 0.040$). Non-conducive work environment ($P < 0.040$), 8-14 days of posting in COVID ward ($P < 0.040$) and more than ten years work experience ($P = 0.040$) were statistically significant for anxiety. Statistically significant for stress were, children at home ($P < 0.008$), receiving a quarantine order ($P < 0.040$) and more than ten years work experience ($P = 0.040$). **Conclusion:** Screening, and providing support to anaesthesiologists identified with having mental health issues is crucial.

INTRODUCTION

The novel coronavirus disease 2019 (COVID-19) pandemic overwhelmed the healthcare systems around the world, profoundly affecting the lives of the healthcare workers (HCWs) caring for the critically ill. The rapid spread and mutations of the virus and the initial lack of knowledge about the disease resulted in fear and anxiety among all HCWs. Government-imposed containment measures and the resulting social isolation restrict access to usual coping mechanisms. Participation of Anaesthesiologists in aerosol-generating procedures that increase the risk of infection[1] (e.g., tracheal intubation, endotracheal/tracheostomy tube

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replacement/removal, bronchial fibrescopy and cardiopulmonary resuscitation[2]), in addition to increased workload, staffing deficiencies, equipment shortages and isolation by separation from family members, make them more prone to stress.[3]The probability of experiencing psychological distress[4] and moral distress[5,6] increase exponentially in overwhelmingly stressful situations such as the pandemic and the anaesthesiologists may show signs ofpost-traumatic stress disorder(PTSD). Hence, our aim was to investigate the mental health outcomes among qualified Anaesthesiologists involved in COVID-19 care in Pondicherry and study the coping mechanisms employed by the Anaesthesiologists. The need for carrying out this study was to better understand and address the mental health issues of anaesthesiologists during pandemics.

- **Primary objective:** To assess mental health outcomes among qualified anaesthesiologists involved in COVID-19 care across Pondicherry.
- **Secondary objective:** To assess the coping strategies used by the anaesthesiologists involved in COVID-19 care.

METHODS

This was an online observational and cross-sectional study. The study was begun after obtaining the institutional ethical committee's clearance as per the Helsinki Declaration of 1975. Qualified Anaesthesiologists who were actively involved in the care of suspected and/or confirmed COVID-19 patients in operation theatres and/or in intensive care units were included in the study. Those anaesthesiologists having a history of psychiatric disorders and/or treatment with psychotropic agents were excluded. All anaesthesiologists working in tertiary care hospitals and private hospitals all over Pondicherry were enrolled into the study after obtaining their informed consent. The participants were provided with the information regarding the nature and purpose of study and the right to retract their data at any time. They were allowed to leave at any point in the study. Anonymity and confidentiality were maintained. They were administered a Google forms-based closed-ended questionnaire via e-mail which was self-administered and only a single response was permitted for each person. The data was collected from 15/08/2021 to 15/12/2021.

The demographic data and workplace characteristics were obtained using a pre-designed proforma. A questionnaire was formulated to assess the risk perception characteristics after referring to similar studies[4,7-11] and the questionnaire was externally validated using face validity and content validity by five independent researchers/academicians from different clinical specialties other than Anaesthesiology from our institution. Mental status outcomes assessment was done using the following validated self-reporting instruments:

A. <u>DASS-21 questionnaire</u>: Mental health status was measured using the Depression, Anxiety and StressScale (DASS-21). This 21-item questionnaire was designed and validated by Lovibond in 1995[12] to measure the psychological distress in a community. DASS-21 is a unique, simple, and approved instrument for assessing depression, anxiety, and stress both in clinical settings and communities[13]. It is a short screening tool with a self-reporting questionnaire. For each disorder, seven questions are considered, and the final score is obtained by the total score of the questions related to it. Likert-scale ranging from zero (did not apply to me at all/never) up to three (applied to me very much, or most of the time/almost always) was used to score each question. Higher scores indicate a higher level of disorder based on a specific classification scoring system. Based on their responses, individuals were relegated into normal/mild/moderate/severe/extremely severe. Comparison of DASS-21 results with psychiatric interviews showed that this tool had a sensitivity and specificity of 75 and 89% and was capable of accurately screening depression, anxiety, and stress.[14,15]

B. <u>Coping Strategies Inventory Short Form</u>: This brief 16-item scale was derived from the 78-item Coping Strategies Inventory.[16,17] The items are rated on a 5-item Likert scale from one to five rated as never, seldom, sometimes, often, and almost always. The different self-reported coping responses which are generally used during difficult situations are evaluated using this scale. Coping responses are classified into problem-focused and emotion-focused, which are further sub-dividedinto either engagement type or disengagement type of strategy.

The data was collected over a period of four months via email. A response time of seven days was allotted. Survey completion reminder emails were sent after one week and again after two weeks from the date of the first email sent. The allocated response time for the reminder mails was also one week. The survey responses were then downloaded into a spreadsheet and tabulated. There was no loss of data such as dropouts or patients lost to follow up.

Sample size was calculated by openepi.com software based on the study of Aly HM.[18] Considering the prevalence of anxiety among health care workers as 90.5%, we estimated a sample size of 138 participants at 95% confidence interval with an absolute precision of 5%.

The statistical analysis was done using Statistical Package for Social Sciences version 20.0, (IBM Corp., Armonk, NY, USA). All quantitative data were expressed as proportions and percentages. The chi-square test was used to assess the association between depression, anxiety and stress with sociodemographic variables. A similar assessment was done for other

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factors. P < 0.05 was considered statistically significant.

RESULTS

One hundred and fifty-five questionnaires were sent and 118 (76%) anaesthesiologists responded.

Socio-demographic data and participant and workplace characteristics are enlisted in Table 1. The risk perception characteristics are enlisted in Table 2.

As measured by the DASS-21 questionnaire, the overall prevalence of depression, anxiety and stress was found to be 38.9%, 41.6% and 18.6% respectively. The classification of the degrees of prevalence of depression, anxiety and stress is given in Table 3. The association between depression, anxiety and stress and demographic data of participants is given in Table 4, 6 and 8 respectively.The association between depression, anxiety and stress and risk perception of participants is given in Table 5, 7 and 9 respectively.Depression, anxiety and stress were found to be higher in the <30 years age group, in females, the unmarried, those without children and those with elders at home.Depression was found to be higher in those who had less than five years (39.5%) and more than 10 years of work experience (39.5%) whereas anxiety and stress were found to be higher in those who had only less than five years of work experience. The most probable leading cause for depression, anxiety and stress was receiving a quarantine order. The least probable cause for depression was salary deduction (36.2%) whereas the least probable cause for anxiety and stress was non-conducive work environment.

On multiple binary logistic regression analysis using chi-square test, significant factors with respect to depression, included, having received a quarantine order after exposure (adjusted odds ratio [aOR] – 8.178; 95% CI – 1.852-36.115; P < 0.040.

On multiple binary logistic regression analysis using chi-square test, significant factors with respect to anxiety, included, may be stressed being posted in COVID-19 ward (adjusted odds ratio [aOR] – 13.087; 95% confidence interval [CI] – 1.438-119.105; P < 0.040, non-conducive work environment (adjusted odds ratio [aOR] – 0.188; 95% CI – 0.042-0.841; P < 0.040, 8-14 days of posting in COVID-19 ward (adjusted odds ratio [aOR] – 0.040; CI – 0.002-0.726;P < 0.040 and anaesthesiologists having more than ten years of experience (adjusted odds ratio [aOR] – 0.093; CI – 0.009-0.896; P = 0.040.

On multiple binary logistic regression analysis using chi-square test, significant factors with respect to stress, included, having children at home (adjusted odds ratio [aOR] – 0.035; 95% confidence interval [CI] – 0.003-0.424; P < 0.008, having received a quarantine order after exposure (adjusted odds ratio [aOR] – 15.317; 95% CI – 1.149-204.020; P < 0.040 and anaesthesiologists having more than ten years of experience (adjusted odds ratio [aOR] – 0.093; CI – 0.009-0.896; P = 0.040.

All age groups used engagement type of coping strategy. Problem focused engagement(PFE) was most used in less than 30 years and 30-60 years age groups and emotion focused engagement(EFE) was used in more than 60 years age group. Problem solving (PS) was the most used in less than 30 years and 30-60 years age groups and expressing emotions(EE) was the most used in more than 60 years age group. Self criticism (SC) was the least used in all three age groups. Both males and females used PFE type of coping strategy. The most common strategy employed was PS in males and both, PS and cognitive restructuring(CR), in females. In both genders, SC was the least used. Emotion focused disengagement (EFD) was least used in all age groups and in both genders.

Age (p=0.038) and gender (p value=0.010) were statistically significant for wishful thinking (WT), a type of problem focused disengagement(PFD). Gender was also statistically significant for, depression (p value = 0.015), anxiety (p value = 0.004) and stress (p value = 0.036).

Table 1: Sociodemographic details of participants and workplace characteristics

Variables	n* (%†)
Age (in years)	
Less than 30	33 (29.2)
31 – 59	75 (66.4)
More than 60	5 (4.4)
Gender	
Male	58 (51.3)
Female	55 (48.7)
Marital status	
Living separately/divorced	1 (0.9)
Married	88 (77.9)
Unmarried	24 (21.2)
Having children at home	
Yes	71 (62.8)
No	42 (37.2)
Suffering with a co-morbidity	

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Yes	32 (28.3)
No	81 (71.7)
Work experience(in years)	
Less than 5	43 (38.1)
5-10 years	27 (23.9)
More than 10	43 (38.1)
Duration of posting in COVID-19ward/ICU‡	
1-7 days	91 (80.5)
8-14 days	10 (8.8)
More than 14 days	12 (10.6)

Footnote: *n – number, †% - percent, ‡ICU – Intensive Care Unit

Table 2: Risk perception characteristics of participants

Probable reason for stress during the COVID-19 pandemic	**Yes**	**No**
Risk perception characteristics	n* (%†)	n (%)
Self-infection	67 (59.3)	46 (40.7)
Fear of transmission to family	102 (90.3)	11 (9.7)
Accidental unprotected direct contact	77 (68.1)	36 (31.9)
Difficulty performing procedures with PPE§	78 (69)	35 (31)
Increased workload	67 (59.3)	46 (40.7)
Deduction in salary	47 (41.6)	66 (58.4)
Non-conducive work environment	63 (55.8)	50 (44.2)
Lack of collegiality	39 (34.5)	74 (65.5)
Received quarantine order	48 (42.5)	65 (57.5)
Family members diagnosed with COVID-19	85 (75.2)	28 (24.8)
Mortality rates in ICU‡	93 (82.3)	20 (17.7)
Difficulty in communication wearing PPE	80 (70.8)	33 (29.2)
Feeling of inadequacy in giving end-of-life care	74 (65.5)	39 (34.5)
Compassion fatigue	79 (69.9)	34 (30.1)

Footnote: *n – number, †% - percent, ‡ICU – Intensive Care Unit, §PPE – Personal Protective Equipment

Table 3: Prevalence of depression, anxiety and stress among participants

Variables	**Normal n* (%†)**	**Mild n (%)**	**Moderate n (%)**	**Severe n (%)**	**Extremely severe n (%)**
Depression	69 (61.1)	14 (12.4)	19 (16.8)	6 (5.3)	5 (4.4)
Anxiety	66 (58.4)	7 (6.2)	22 (19.5)	6 (5.3)	12 (10.6)
Stress	92 (81.4)	8 (7.1)	9 (8.0)	3 (2.7)	1 (0.9)

Footnote: *n – number, †% - percent

Table 4: Association between depression and demographic data

Variables (Depression)		**Normal, n* (%†)**	**Abnormal, n (%)**	**Total, n (%)**	**p value**	**aOR‖ [CI**]**
Age (in years)	Less than 30	19 (57.6)	14 (42.4)	33 (100)	Ref††	
	31-59	46 (61.3)	29 (38.7)	75 (100)	0.228	2.817 [0.523-15.157]
	More than 60	4 (80)	1 (20)	5 (100)	0.758	2.022 [0.022-180.478]
Gender	Male	42 (72.4)	16 (27.6)	58 (100)	Ref	
	Female	27 (49.1)	28 (50.9)	55 (100)	0.201	2.088 [0.675-6.454]
Marital status	Married	55 (61.8)	34 (38.2)	89 (100)	0.4	2.065 [0.381-11.18]
	Unmarried	14 (58.3)	10 (41.7)	24 (100)	Ref	
Having children at home	Yes	46 (64.8)	25 (35.2)	71 (100)	0.078	0.213 [0.038-1.186]
	No	23 (54.8)	19 (45.2)	42 (100)	Ref	
Having elders at home	Yes	43 (57.3)	32 (42.7)	75 (100)	0.953	1.034 [0.338-3.165]

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	No	26 (68.4)	12 (31.6)	38 (100)	Ref	
Suffering from one co-morbidity	Yes	22 (68.8)	10 (31.3)	32 (100)	0.292	1.59 (0.66-3.78)
	No	47 (58)	34 (42)	81 (100)	Ref	
Work experience (in years)	Less than 5	26 (60.5)	17 (39.5)	43 (100)	Ref	
	5-10	17 (63)	10 (37)	27 (100)	0.865	0.864 [0.159-4.671]
	More than 10	26 (60.5)	17 (39.5)	43 (100)	0.358	2.25 [0.402-12.414]
Standard protocol followed	Yes	63 (63)	37 (37)	100(100)	0.415	0.506 [0.098-2.594]
	No	6 (46.2)	7 (53.8)	13 (100)	Ref	
Duration of posting in COVID-19ward/ICU‡	1-7 days	58 (63.7)	33 (36.3)	91 (100)	0.533	0.571 [0.098-3.324]
	8-14 days	6 (60)	4 (40)	10 (100)	0.235	0.213 [0.016-2.726]
	More than 14 days	5 (41.7)	7 (58.3)	12 (100)	Ref	

Footnote: *n – number, †% - percent, ‡ICU – Intensive Care Unit, ||aOR – associated Odds Ratio, **CI – Confidence Interval, ††Ref – Reference

Table 5: Association between depression and risk perception of participants

Variables (Depression)		Normal, n* (%†)	Abnormal, n (%)	Total, n (%)	p value	aOR|| [CI**]
Self-infection	Yes	38 (56.7)	29 (43.3)	67 (100)	0.253	0.634 (0.29-1.388)
	No	31 (67.4)	15 (32.6)	46 (100)	Ref††	
Fear of transmission	Yes	60 (58.8)	42 (41.2)	102(100)	0.568	1.985 [0.188-20.903]
	No	9 (81.8)	2 (18.2)	11 (100)	Ref	
Accidental direct contact	Yes	48 (62.3)	29 (37.7)	77 (100)	0.152	0.389 [0.107-1.416]
	No	21 (58.3)	15 (41.7)	36 (100)	Ref	
PPE§ – difficulty performing procedures	Yes	45 (57.7)	33 (42.3)	78 (100)	0.420	0.517 [0.104-2.564]
	No	24 (68.6)	11 (31.4)	35 (100)	Ref	
Increased workload	Yes	35 (52.2)	32 (47.8)	67 (100)	0.062	3.334 [0.941-11.806]
	No	34 (73.9)	12 (26.1)	46 (100)	Ref	
Deduction in salary	Yes	30 (63.8)	17 (36.2)	47 (100)	0.57	0.704 [0.211-2.353]
	No	39 (59.1)	27 (40.9)	66 (100)	Ref	
Non-conducive work environment	Yes	40 (63.5)	23 (36.5)	63 (100)	0.128	0.365 [0.099-1.338]
	No	29 (58)	21 (42)	50 (100)	Ref	
Lack of collegiality	Yes	21 (53.8)	18 (46.2)	39 (100)	0.313	1.948 [0.532-7.123]
	No	48 (64.9)	26 (35.1)	74 (100)	Ref	
Received quarantine order	Yes	20 (41.7)	28 (58.3)	48 (100)	0.006	8.178 [1.852-36.115]
	No	49 (75.4)	16 (24.6)	65 (100)	Ref	
Family diagnosed with COVID-19	Yes	54 (63.5)	31 (36.5)	85 (100)	0.42	0.565 [0.141-2.263]
	No	15 (53.6)	13 (46.4)	28 (100)	Ref	
Mortality rates in ICU‡	Yes	55 (59.1)	38 (40.9)	93 (100)	0.996	0.994 [0.132-7.439]
	No	14 (70)	6 (30)	20 (100)	Ref	
Communication difficulty wearing PPE	Yes	46 (57.5)	34 (42.5)	80 (100)	0.786	1.242 [0.258-5.981]
	No	23 (69.7)	10 (30.3)	33 (100)	Ref	
Feeling inadequacy giving end-of-life care	Yes	39 (52.7)	35 (47.3)	74 (100)	0.793	1.235 [0.255-5.964]
	No	30 (76.9)	9 (23.1)	39 (100)	Ref	
Compassion fatigue	Yes	44 (55.7)	35 (44.3)	79 (100)	0.974	1.026 [0.215-4.897]
	No	25 (73.5)	9 (26.5)	34 (100)	Ref	

Footnote: *n – number, †% - percent, ‡ICU – Intensive Care Unit, §PPE – Personal Protective Equipment, ||aOR – associated Odds Ratio, **CI – Confidence Interval, ††Ref – Reference

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Table 6: Association between anxiety and demographic data

Variables (Anxiety)		Normal, n (%)	Abnormal , n (%)	Total, n (%)	p value	aOR [Confidence interval]
Age (in years)	Less than 30	16 (48.5)	17 (51.5)	33 (100)	Ref	
	31-59	46 (61.3)	29 (38.7)	75 (100)	0.062	7.581 [0.906-63.415]
	More than 60	4 (80.0)	1 (20.0)	5 (100)	0.296	11.377 [0.118-1092.231]
Gender	Male	41 (70.7)	17 (29.3)	58 (100)	Ref	
	Female	25 (45.5)	30 (54.5)	55 (100)	0.289	1.915 [0.575-6.369]
Marital Status	Married	54 (60.7)	35 (39.3)	89 (100)	0.933	0.928 [0.166-5.177]
	Unmarried	12 (50.0)	12 (50.0)	24 (100)	Ref	
Having children at home	Yes	46 (64.8)	25 (35.2)	71 (100)	0.095	0.192 [0.027-1.329]
	No	20 (47.6)	22 (52.4)	42 (100)	Ref	
Having elders at home	Yes	41 (54.7)	34 (45.3)	75 (100)	0.214	2.308 [0.617-8.62]
	No	25 (65.8)	13 (34.2)	38 (100)	Ref	
Suffering with co-morbidity	Yes	20 (62.5)	12 (37.5)	32 (100)		1.268 (0.54-2.93)
	No	46 (56.8)	35 (43.2)	81 (100)	Ref	
Work experience (in years)	Less than 5	20 (46.5)	23 (53.5)	43 (100)	Ref	
	5-10	18 (66.7)	9 (33.3)	27 (100)	0.052	0.121 [0.014-1.019]
	More than 10	28 (65.1)	15 (34.9)	43 (100)	0.04	0.093 [0.009-0.896]
Standard protocol followed	No	8 (61.5)	5 (38.5)	13 (100)	Ref	
	Yes	58 (58)	42 (42)	100 (100)	0.186	3.229 [0.568-18.354]
Duration of posting in COVID ward/ICU	1-7 days	57 (62.6)	34 (37.4)	91 (100)	0.168	0.256 [0.036-1.778]
	8-14 days	5 (50)	5 (50)	10 (100)	0.03	0.04 [0.002-0.726]
	More than 14 days	4 (33.3)	8 (66.7)	12 (100)	Ref	

Footnote: *n – number, †% - percent, ‡ICU – Intensive Care Unit, ||aOR – associated Odds Ratio, **CI – Confidence Interval, ††Ref – Reference

Table 7: Association between anxiety and risk perception of participants

Variables (Anxiety)		Normal, n* (%†)	Abnormal , n (%)	Total, n (%)	p value	aOR|| [CI**]
Self-infection	Yes	37 (55.2)	30 (44.8)	67 (100)	0.407	0.723 (0.335-1.559)
	No	29 (63)	17 (37)	46 (100)	Ref††	
Fear of transmission	Yes	57 (55.9)	45 (44.1)	102 (100)	0.175	6.344 [0.440-91.408]
	No	9 (81.8)	2 (18.2)	11 (100)	Ref	
Accidental direct contact	Yes	44 (57.1)	33 (42.9)	77 (100)	0.372	0.521 [0.125-2.174]
	No	22 (61.1)	14 (38.9)	36 (100)	Ref	
PPE§ – difficulty performing procedures	Yes	42 (53.8)	36 (46.2)	78 (100)	0.498	0.53 [0.84-3.317]
	No	24 (68.6)	11 (31.4)	35 (100)	Ref	
Increased workload	Yes	34 (50.7)	33 (49.3)	67 (100)	0.078	3.515 [0.870-14.199]
	No	32 (69.6)	14 (30.4)	46 (100)	Ref	
Deductions in salary	Yes	28 (59.6)	19 (40.4)	47 (100)	0.047	0.244 [0.060-0.983]
	No	38 (57.6)	28 (42.4)	66 (100)	Ref	
Non-conducive work environment	Yes	38 (60.3)	25 (39.7)	63 (100)	0.029	0.188 [0.042-0.841]
	No	28 (56.0)	22 (44.0)	50 (100)	Ref	
Lack of collegiality	Yes	17 (43.6)	22 (56.4)	39 (100)	0.049	9.338 [1.009-18.645]
	No	49 (66.2)	25 (33.8)	74 (100)	Ref	
Received quarantine order	Yes	18 (37.5)	30 (62.5)	48 (100)	0.085	3.907 [0.829-18.41]
	No	48 (73.8)	17 (26.2)	65 (100)	Ref	

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Family diagnosed with COVID-19	Yes	49 (57.6)	36 (42.4)	85 (100)	0.445	0.529 [0.103-2.71]
	No	17 (60.7)	11 (39.3)	28(100)	Ref	
Mortality rates in ICU‡	Yes	52 (55.9)	41 (44.1)	93 (100)	0.473	2.442 [0.213-27.93]
	No	14 (70)	6 (30)	20 (100)	Ref	
Communication difficulty wearing PPE	Yes	43 (53.8)	37 (46.3)	80 (100)	0.749	0.744 [0.122-4.538]
	No	23 (69.7)	10 (30.3)	33 (100)	Ref	
Feeling inadequacy giving end-of-life care	Yes	35 (47.3)	39 (52.7)	74 (100)	0.054	6.705 [0.971-46.288]
	No	31 (79.5)	8 (20.5)	39 (100)	Ref	
Compassion fatigue	Yes	39 (49.4)	40 (50.6)	79 (100)	0.215	3.363 [0.493-22.925]
	No	27 (79.4)	7 (20.6)	34 (100)	Ref	

Footnote: *n – number, †% - percent, ‡ICU – Intensive Care Unit, §PPE – Personal Protective Equipment, ||aOR – associated Odds Ratio, **CI – Confidence Interval, ††Ref – Reference

Table 8: Association between stress and demographic data

Variables (Stress)		Normal, n (%)	Abnormal, n (%)	Total, n (%)	p value	aOR [Confidence interval]
Age (in years)	Less than 30	26 (78.8)	7 (21.2)	33 (100)	Ref	
	31-59	61 (81.3)	14 (18.7)	75 (100)	0.095	7.715 [0.702-84.778]
	More than 60	5 (100)	0 (0)	5 (100)	---	---
Gender	Male	52 (89.7)	6 (10.3)	58 (100)	Ref	
	Female	40 (72.7)	15 (27.3)	55 (100)	0.064	6.988 [0.896-54.491]
Marital status	Married	73 (82)	16 (18)	89 (100)	0.101	6.627 [0.693-63.349]
	Unmarried	10 (79.2)	5 (20.8)	24 (100)	Ref	
Having children at home	Yes	62 (87.3)	9 (12.7)	71 (100)	0.008	0.035 [0.003-0.424]
	No	30 (71.4)	12 (28.6)	42 (100)	Ref	
Having elders at home	Yes	59 (78.7)	16 (21.3)	75 (100)	0.375	2.193 [0.387-12.421]
	No	33 (86.8)	5 (13.2)	38 (100.0)	Ref	
Suffering with one co-morbidity	Yes	27 (84.4)	5 (15.6)	32 (100)	0.611	1.329 (0.44-3.99)
	No	65 (80.2)	16 (19.8)	81 (100)	Ref	
Work experience (in years)	Less than 5	20 (46.5)	23 (53.5)	43 (100)	Ref	
	5-10	18 (66.7)	9 (33.3)	27 (100)	0.052	0.121 [0.014-1.019]
	More than 10	28 (65.1)	15 (34.9)	43 (100)	0.04	0.093 [0.009-0.896]
Standard protocol followed	Yes	81 (81)	19 (19)	100 (100)	0.378	3.764 [0.197-71.741]
	No	11 (84.6)	2 (15.4)	13 (100)	Ref	
Duration of posting in COVID ward/ICU	1-7 days	76 (83.5)	15 (16.5)	91 (100)	0.583	2.279 [0.120-43.229]
	8-14 days	7 (70)	3 (30)	10 (100)	0.935	0.842 [0.013-51.266]
	More than 14 days	9 (75)	3 (25)	12 (100)	Ref	

Footnote: *n – number, †% - percent, ‡ICU – Intensive Care Unit, ||aOR – associated Odds Ratio, **CI – Confidence Interval, ††Ref – Reference

Table 9: Association between stress and risk perception of participants

Variables (Anxiety)		Normal, n* (%†)	Abnormal, n (%)	Total, n (%)	p value	aOR|| [CI**]
Self-infection	Yes	54 (80.6)	13 (19.4)	67 (100)	0.787	0.874 (0.330-2.315)
	No	38 (82.6)	8 (17.4)	46 (100)	Ref	
Fear of transmission	Yes	82 (80.4)	20 (19.6)	102 (100)	0.719	0.461 [0.006-31.317]
	No	10 (90.9)	1 (9.1)	11 (100)	Ref	

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Accidental direct contact	Yes	63 (81.8)	14 (18.2)	77 (100)	0.313	0.399 [0.067-2.374]
	No	29 (80.6)	7 (19.4)	36 (100)	Ref	
PPE§ – difficulty performing procedures	Yes	63 (80.8)	15 (19.2)	78 (100)	0.325	0.262 [0.018-3.767]
	No	29 (82.9)	6 (17.1)	35 (100)	Ref	
Increased workload	Yes	51 (76.1)	16 (23.9)	67 (100)	0.13	4.556 [0.64-32.436]
	No	41 (89.1)	5 (10.9)	46 (100)	Ref	
Deduction in salary	Yes	39 (83)	8 (17)	47 (100)	0.302	0.32 [0.036-2.783]
	No	53 (80.3)	13 (19.7)	66 (100)	Ref	
Non-conducive work environment	Yes	53 (84.1)	10 (15.9)	63 (100)	0.104	0.168 [0.019-1.442]
	No	39 (78)	11 (22)	50 (100)	Ref	
Lack of collegiality	Yes	29 (74.4)	10 (25.6)	39 (100)	0.634	1.661 [0.205-13.467]
	No	63 (85.1)	11 (14.9)	74 (100)	Ref	
Received quarantine order	Yes	33 (68.8)	15 (31.3)	48 (100)	0.039	15.317 [1.149-204.02]
	No	59 (90.8)	6 (9.2)	65 (100)	Ref	
Family diagnosed with COVID-19	Yes	70 (82.4)	15 (17.6)	85 (100)	0.969	0.959 [0.118-7.765]
	No	22 (78.6)	6 (21.4)	28 (100)	Ref	
Mortality rates in ICU‡	Yes	75 (80.6)	18 (19.4)	93 (100)	0.606	0.424 [0.016-10.967]
	No	17 (85)	3 (15)	20 (100)	Ref	
Communication difficulty wearing PPE	Yes	64 (80)	16 (20)	80 (100)	0.611	1.919 [0.155-23.78]
	No	28 (84.8)	5 (15.2)	33 (100)	Ref	
Feeling inadequacy giving end-of-life care	Yes	56 (75.7)	18 (24.3)	74 (100)	0.392	3.157 [0.226-43.936]
	No	36 (92.3)	3 (7.7)	39 (100)	Ref	
Compassion fatigue	Yes	61 (77.2)	18 (22.8)	79 (100)	0.349	4.976 [0.173-142.918]
	No	31 (91.2)	3 (8.8)	34(100.0)	Ref	

Footnote: *n – number, †% - percent, ‡ICU – Intensive Care Unit, §PPE – Personal Protective Equipment, ||aOR – associated Odds Ratio, **CI – Confidence Interval, ††Ref – Reference

DISCUSSION

Many studies have been conducted to understand anxiety, insomnia, PTSD, stress and depression in HCWs across the world. However, this is probably the first study about depression, anxiety and stress in anaesthesiologists in Pondicherry during COVID-19 pandemic.

The prevalence of depression (38.9%), anxiety (41.6%) and stress (18.6%) was found to be lower in our study as compared tostudies in China during COVID-19[2,19] and also a study done across India.[10]This could be ascribed to COVID-19 emerging laterin Pondicherry and also the effective government preparedness to deal with the pandemic, having witnessed significant hospitalizations and deaths, including many frontline HCWs, in China, other countries, and parts of India.

Factors related to depression, anxiety and stress in our study included age <30 years, females, unmarried, having no children, having elders at home, less than five years work experience, receiving a quarantine order, a non-conducive work environment, increased working hours, being stressed due to COVID-19 ward/intensive care unit posting, lack of collegiality and a feeling of inadequacy in providing end-of-life care. Similar to our study, Hawryluck et al.[20] reported that isolation and quarantine during the outbreak were stressful.An anticipated lack of supplies and absence of clear protocols to manage suspected and confirmed cases of COVID-19 added to the concerns of physicians[21-25]about transmitting the disease to their loved ones.However, in our study, personal protective equipment (PPE) availability was not a significant problem and standard protocols were in place for most participants.This is probably because, having observed the lacunae, Pondicherry was better prepared to handle the late arrival of COVID-19 by efficiently putting to practice revised guidelines.

The prevalenceof infectious diseases is a common cause of psychological trauma. Xiao et al[26] concluded that social support and sleep quality had a major influence on anxiety and stress. Anxiety was found to be higher in female medical staff in a Chinese study conducted during the pandemic.[27]It is believed that fear and arousal responses[28] in women are more prominent. In our study, the anxiety and depression scores were higher in women. This could be due to unusual circumstances where women are burdened with additional responsibilities such as caring for children's learning needs and family. The separation from their families including children causes

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loneliness resulting in them becoming depressed. Hence, giving support may be important.

The level of anxiety, stress and depression was higher in the unmarried group. This did not correspond with Azimi et al.[29]Stress was found to be less amongst the highly educated.[30] However in our study, those with a greater number of years of experience were more stressed (p=0.040).

The anaesthesiologists and other HCWs were prone to physical, mental and moral distress. The physical conditions of working including wearing the PPE and working under non-physiological conditions, watching patients sinking in spite of giving the best-known treatment, caring during the final few hours and minutes and the agony of feeling compassion for each patient who could not have their loved ones around and then counselling the patient's attendants, all this results in various levels of mental health disturbances among HCWs. All this along with staying away from family and maintaining contact to know about their welfare and keeping abreast of the constantly changing government policies and treatment guidelines contributes further to stress. The updating of daily statistics in the news as well as constant notifications on different social media networks caused much panic.

The coping strategy of EFD characterized by WT was statistically significant among all age groups and bothgendersaddressing the inability of the HCWs to engage effectively in the pandemic. This may be associated with stress, illness and affective symptoms. Abnormalities in the regulation of the hypothalamic-pituitary adrenal axis and the sympatho-adrenomedullary system cause the triad of depression, anxiety and stress.[31] Coping may play an important role in the outcomes from stressful events.[32]Only 17.1% of the physicians were observed to be high resilient copers amidst the pandemic in a study conducted in Egypt[30] while 14% participants were scored at-risk for PTSD and the most commonly used coping strategies were acceptance (mean [standard deviation (SD)] Brief COPE scores 5.6 [2.4]), positive reframing (4.3 [2.3]) and self-distraction (4.7 [2.2]) in another study.[8]

Open discussions and frequent meetings among health care providers, infection control personnel, administrative staff and government authorities are essential to foster trust. The number of working hours and the availability of adequate time for rest, relaxation and recreation are important. The signs of anxiety and stress are poor work performance, chronic fatigue etc.[33] It is important to detect mental health disturbances early. Establishing tele-counselling helplines and providing psychological support will help minimise mental disturbances. Frontline workers should be assisted with appropriate psychosocial interventions,[34] after screening by multidisciplinary teams.[35]Encouragement and support from colleagues, appreciation from patients and caregivers, acceptance, validation and gratitude for the inevitability of life and death along with proper knowledge help in positively motivating physicians.[36] Acquiring healthy coping skills like keeping away from discussing excessively the news and rumours, connecting with family and friends online, staying active, pursuing hobbies, performing physical exercises, practising sleep hygiene, relaxation and alternative therapy help reduce stress from COVID-19.[37]

The major strengths of our study were that it was conducted predominantly among anaesthesiologists which may be a first in Pondicherry and it includes validated risk-perception characteristics.

Limitations and constraints: Since the pandemic broke out suddenly, there was no pre-crisis baseline with which we could corroborateour study findings. We had to resort to self-reported questionnaires, an indirect method of interview, though inferior to a Psychiatrist's clinical diagnostic interviews, due to the pandemic situation. Due to the study being cross-sectional, it precluded causal assumptions and alsoinferences on sequences of events could not be made. Also, people who were more likely to have had problems, may have filled the survey.

CONCLUSION

From this study, we can infer that mental health is of utmost importance in practicing anaesthesiologists especially in pandemic situations, to provide quality health care. Identifying and providing targeted interventions and support where needed at the right time is crucial.

Abbreviations used

Abbreviation	Expanded word
COVID-19	coronavirus disease 2019
HCWs	healthcare workers
PTSD	post-traumatic stress disorder
DASS-21	Depression, Anxiety and Stress Scale
PFE	problem focused engagement
EFE	emotion focused engagement
PS	problem solving
EE	expressing emotions
SC	self criticism
CR	cognitive restructuring
EFD	emotion focused disengagement
WT	wishful thinking
PFD	problem focused disengagement
PPE	personal protective equipment
SD	standard deviation

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