IMPACT OF COVID-19 ON THE HEART: INSIGHT AND CURRENT EVIDENCE BASED KNOWLEDGE AMONG PHYSICIANS

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ABSTRACT

COVID 19 and its impact on the heart is a must to understand the disease in order to diagnose and manage the disease in time with a purpose of curbing down the fatality. This study aims to test and identify the gaps if any between the "Insight" and "current evidence based Knowledge" on the Impact of COVID-19 on the heart. A questionnaire based qualitative cross sectional descriptive study was conducted among Physicians all over Nepal directly or indirectly involved in COVID-19 management. Data was collected via google forms via email or viber/ whattsapp and laid in excel file. Proportion of response from each linked question in two sets containing 11 questions, was compared under the domain "Insight" versus "Current Evidenced based knowledge" having 5 various subtopics. One hundred doctors participated in the study. Overall positive difference of 19% was noted between insight and evidence based knowledge. The highest positive difference was noted regarding atrial fibrillation in COVID-19 (38%), rise in NT pro BNP and its prognosis in heart failure (35%), role of ACE-2 receptor in COVID-19 and acute lung injury (30%) and prevalence and type of arrhythmia in COVID-19 (25%) and lowest (-1%) in regard to preferred reperfusion therapy in STEMI in COVID-19. There were substantial gaps identified between insight and current evidence based knowledge which can be bridged by training, webinar, review article dissemination, peer clinical discussion at government and non-government level in all the states throughout the nation.

KEYWORDS

COVID-19, evidence based, heart, insight, knowledge

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INTRODUCTION

The outbreak of COVID-19 from Wuhan, China, has shown strong pathological impact on cardiovascular disease. The observed high case fatality rate in COVID-19 amid patients with hypertension and heart disease is 6% and 10.5% respectively.[1-2] One of the proposed theory behind this high fatality rate is the possible abundance of angiotensin-converting enzyme 2 (ACE-2) receptor in cardiovascular system which is spike protein phillic of SARS-Cov-2.[3-4] The mortality rate observed in COVID-19 patients with rise in (high sensitivity) hs-troponin is 10 fold more than those having normal level. Acute cardiac injury has been observed in 6-7% of cases.[5] The main aim of this study is to assess the Insight and Knowledge of physicians in regard to COVID-19 and its impact on the heart and to identify whether any gap exists so that necessary steps can be taken forward to bridge those gaps leading to curtailment of the morbidity and mortality.

MATERIALS AND METHODS

Qualitative questionnaire based cross sectional descriptive study was conducted among 100 Physicians (registered general physicians, Internists, residents and cardiologists) of Nepal using convenience sampling method from December 2021 till January 2022 after ethical permission was obtained from ERB of NHRC.

Physicians directly or indirectly involved in COVID-19 management responding within a week time from the time of receipt of e-questionnaire (designed and validated in-terms of structure and face content by 15 physicians) were included in the study. Data were collected through google form questionnaire via email/whatsapp/viber with consent of the participant (embedded in the first page of google form) and collected data were fed into excel. Proportion of response from each linked question in two sets containing 11 questions (Q) each was compared under the domain "Insight" in the form of true or false closed end questionnaire Vs "Current Evidenced based knowledge" in the form of multiple choice questions (MCQs) with single best response under 5 subtopics i.e. (1) type of heart disease in COVID-19, (2) role of high sensitivity (hs) troponin and n-terminal pro b-type natriuretic peptide (NT-pro BNP) in COVID-19, (3) renin–angiotensin–aldosterone system (RAAS) blockers in COVID and ACE mediated SARS-Cov-2 damage, (4) arrhythmias and COVID-19 and (5) treatment and essential practices in COVID-19 era. The difference between this "insight" and "current evidence based knowledge" for each linked question was calculated in terms of percentage. The positive difference suggests the participants perceived that they have the "insight" but actually they don't have the knowledge. Negative difference suggests that participant did not possess the "insight" but they have the "knowledge".

RESULTS

In this study we have total 100 participants enrolled from 1st Dec. 2021 till 30th Jan. 2022 and all participant agreed and consented for the participation. The e-form was sent to 150 doctors out of which 100 doctors responded in the given time frame. Most participants were male (86%) and distribution of age group is shown below in Table 1.

Three most common participants group were cardiologists (37%), Physicians (33%) & MD residents (20%) comprising 90% of all the study group which is well depicted in the Pie chart given below. Rest 10% was comprised by various sub-specialization of medicine and CTVS surgeon.

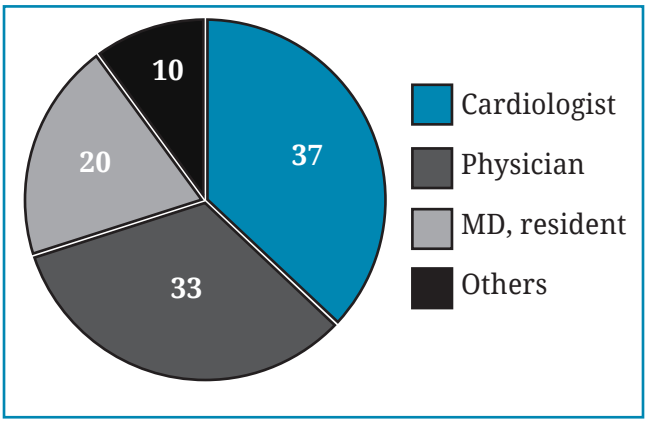

Chart 1: Showing participant's designation

Analysis of each linked question from Question 1(Q1) to Question 11 (Q11) with the inference has been tabulated below Table 2.

Table 1: Age group and number of participants

Age group (years)	n (%)
20-30	26 (26)
30-40	41 (41)
40-60	29 (29)
60-70	4 (4)
>70	0

Table 2: Showing gap between insight and evidence based knowledge in various areas tested

Areas Tested	Questions (Notion)	Insight (%)	Evidence based knowledge	Gap (%)
Type of Heart disease in COVID-19	Q1. Acute cardiovascular COVID-19 syndrome	96 (96)	78 (78)	18
Type of Heart disease in COVID-19	Q2. Type of MI (Myocardial Infarction) in COVID-19	91 (91)	72 (72)	19
Role of hs troponin and NT-pro BNP in COVID-19	Q3. Implication of raised hs Troponin in COVID-19 mortality	84 (84)	78 (78)	6
Role of hs troponin and NT-pro BNP in COVID-19	Q4. Rise in NT pro BNP and its prognosis in COVID-19	84 (84)	49 (49)	35
RAAS Blockers in COVID-19 & ACE mediated SARS-Cov-2 damage	Q5. Role of ACE 2 receptor in COVID-19 and acute lung injury / adverse myocardial remodeling	87 (87)	57 (57)	30
RAAS Blockers in COVID-19 & ACE mediated SARS-Cov-2 damage	Q6. Use of RAAS inhibitor in COVID-19	88 (88)	80 (80)	8
Arrhythmias & COVID-19	Q7. Prevalence and type of arrhythmia in COVID-19	85 (85)	60 (60)	25
Arrhythmias & COVID-19	Q8. Atrial fibrillation in COVID-19	82 (82)	44 (44)	38
Treatment and essential practices in COVID-19 era	Q9. Preferred strategy of reperfusion in STEMI (ST elevation Myocardial Infarction)	61 (61)	62 (62)	-1
Treatment and essential practices in COVID-19 era	Q10. Drug effective in COVID-19 treatment	92 (92)	88 (88)	4
Treatment and essential practices in COVID-19 era	Q11. Role of LMWH (Low Molecular Weight heparin) in prevention of thromboembolism	75 (75)	56 (56)	19
Overall Difference	Q1 till Q11	84.09	65	19.09

DISCUSSION

Under the 1st subtopic: Type of Heart disease in COVID-19, Q1 and Q2 were designed. Q1 as per above table 96% had an insight whereas 78% had current evidenced based knowledge about acute cardiovascular COVID-19 syndrome including acute cardiac injury with a positive difference of 18% implying the lack of knowledge about the syndrome and its component which encompasses acute cardiac injury, acute myocarditis, stress induced cardiomyopathy, acute coronary syndrome, arrhythmias, heart failure including cardiogenic shock, acute pericarditis with or without tamponade and thromboembolic complication including pulmonary embolism.[6] Similarly 19% positive difference has been seen in Q2 which deals with mechanism of MI involved in COVID-19 i.e. Type 1 due to inflamed plaque rupture leading to athero-thrombosis/dissection and Type 2 due to demand supply mismatch.[7]

Likewise under 2nd subtopic: role of hs troponin and NT-pro BNP in COVID-19, Q3 and Q4 were designed. Q3 response when analysed showed mere positive difference of 6% implying there is minimal gap between insight

and evidence based knowledge regarding raised hs troponin impact on mortality of COVID-19 patients by 10 fold(8). In the contrary Q4 shows positive difference of 35% implying significant gap between insight and evidenced based knowledge regarding Prognostic value of NT-pro BNP in severe COVID-19 patients with a lower cutoff value than found in heart failure patients.[9]

Under 3rd subtopic: RAAS Blockers in COVID and ACE mediated SARS-Cov-2 damage, Q5 and Q6 were designed. Q5 response on analysis showed significant positive difference of 30% implying there is gap in understanding about SARS-Cov-2 interaction with ACE receptors i.e. up regulation of ACE-1 pathway and downregulation of ACE-2 pathway culminating into acute lung injury and adverse myocardial remodelling. Contrarily, most physicians with mere positive difference of 8% agrees upon the current evidence based fact that despite significant SARS-Cov-2 interaction with ACE receptors, ACE inhibitors and ARBs are safe co-prescription in COVID19 patients as preached by societal guidelines and observational studies.[10]

Under 4th subtopic: Arrhythmias and COVID-19, Q7 and Q8 were designed. Q7 and Q8 responses on analysis shows significant positive difference of 25% and 38% respectively which implies there is significant gap between insight and knowledge about the fact that COVID-19 experiences all forms of brady and tachyarrhythmia out of which Atrial fibrillations is the commonest one.[11] More positive difference has been noted in Q8 than Q7 as the question designed asks the response in percentage which may not be at the fingertip of physicians.

Under 5th subtopic: Treatment and essential practices in COVID-19 era, Q9, Q10 and Q11 were designed. Interestingly Q9 showed small negative difference of 1% which implies that most of the physicians is well aware of the evidence based fact that thrombolysis is the preferred approach of reperfusion in STEMI patients in non COVID cardiac cathlab facility.[12] Similarly, Q10 response analysis showed mere positive difference of 4% implying most physicians are well aware of the evidence based fact that only mortality reducing therapeutic drug is steroids in COVID-19.[13] Contrarily, significant positive difference was found in response analysis of 18% depicting lack of evidence based knowledge regarding role of Low molecular weight heparin (LMWH) as prophylaxis for thromboembolic phenomenon in COVID-19 patients.[14]

Overall positive difference of 19.04% was noted amid participants in totality when comparing insight versus current evidence based knowledge from Q1-Q11 indicating substantial gap.

Being COVID-19, a novel disease, its association with existing cardiovascular disease and de novo impact on heart in the form of acute cardiac injury needs to be addressed by treating physician in time with adequate insight and as well as knowledge to reduce the case fatality rate. This study overall has identified that there exists substantial gap between insight and current evidence based knowledge despite its limitation and short comings being a questionnaire based study on a novel disease. The identified gaps can be bridged with the help of training, webinar, review article dissemination, peer clinical discussion at government and non-government level in all the states in order to combat COVID-19 in a unified way from cardiovascular morbidity and mortality perspective.

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