

# Burn Care in Kirtipur Hospital before and during COVID 19 Pandemic: Survey of Psychological Issues and Practice Behaviours of Burn Care Personnel

KK NAKARMI, SJ BASNET, B KARKI, M GHARTIMAGAR, KK NAGARKOTI, MK YADAV, SM RAI

## Abstract:

**Introduction:** The COVID 19 pandemic has adversely impacted all aspects of health care throughout the world. Burn care in lower and middle income countries has suffered the most. We aimed to compare burn care at Kirtipur Hospital before and during the pandemic and explore psychological issues and practice behaviour among burn care worker (BCW).

**Methods:** Retrospective data analysis of burn patients admitted during April to August of 2019 and 2020 was done. Internet based survey of BCW was done.

**Results:** Burn admissions, demographics and characteristics did not change. Fewer surgeries were undertaken in 2020.

Almost half of the BCW worked 12 hours shift or longer. Most were working on half pay. Nearly everyone was using

hand sanitizers, hand washing and masks. Few had access to level II personal protective equipments (PPE) to see suspected patients; fewer had access to face shield, KN 95 masks and boot. Even gloves and caps were scarce. Many feared getting themselves or family members infected. Majority realized the need of clear hospital policy on how they would be managed when infected.

**Conclusion:** Number, types, severity and mortality did not change. Number of surgeries decreased. Issues like pay cuts, longer working hours and lack of PPEs were reported by majority.

**Keywords:** Burn, burn care personnel, corona pandemic, COVID 19, PPE

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## Introduction:

More than 95% of fire related burn injuries occur in the low and middle income countries (LMIC). It leads to more than 300,000 deaths every year of which half is attributed to Southeast Asia alone (1). Management of burns is challenging as the treatment is lengthy and demands a dedicated team management. Furthermore, it is expensive and often financially catastrophic for the already impoverished patients from LMICs (2–4); and is often neglected in these countries even in normal conditions (5). Sudden emergence of COVID 19 pandemic has adversely affected resource management throughout the world even in high income countries (6). This particularly impacted burn care (7). The effect could be detrimental in already resource scarce countries.

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Department of Burns, Plastic and Reconstructive Surgery, Nepal Cleft and Burn Center Phect-NEPAL, Kirtipur Hospital, Kathmandu, Nepal

**Address of Correspondence:** Kiran K. Nakarmi, Department of Burns, Plastic and Reconstructive Surgery, Nepal Cleft and Burn Center Phect-NEPAL, Kirtipur Hospital, Kathmandu, Nepal, Phone: +977-9851061490, Email: [kknakarmi@yahoo.com](mailto:kknakarmi@yahoo.com)

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Kirtipur Hospital is a high volume burn center which routinely receives patients from all over the country and neighbouring Indian states. While the lockdown has severely restricted the movement of individuals, Kirtipur Hospital continues to receive high volume of patients; especially as other burn centers in the city are admitting fewer burn patients than usual due to need of resource redistribution to take care of COVID 19 patients.

Initially, a decrease in the number of patients allowed us to cohort our burn care worker (BCW) to minimize exposure; however, lack of resources has forced us to work in relatively unsafe environment with extremely limited access to adequate personal protective equipment (PPE). This increases the risk not only to BCW but also patients and families. Patient families are at risk of contracting COVID 19 infection from other patients and families due to shared facilities in the common wards. Patients are particularly vulnerable due to impaired immune function in the setting of major burn injury.

The hospital has adopted a policy of testing the burn patients before admission. Initially, rapid diagnostic test

(antibody) was done to all the patients (Figure 1); later polymerase chain reaction (PCR) test was made mandatory for all the patients (Figure 2). Hospital has also adopted the policy of allowing only two family members per family and mask to all the patients and families to reduce the cross infection. However PCR test is not available in our hospital. Nasopharyngeal swab was taken by the laboratory staff only during a one hour window (9-10 AM) and sent to nearby laboratory. It took us between 6 hours to few days to get the report back depending on the load of samples. Until then, patient and family were kept in the observation facility and emergency treatment such as fluid resuscitation and dressing were allowed. Only few patients required escharotomy/fasciotomy while report was still pending. Once the report was negative then they would be transferred to the burn ward and prepared for surgery in the next available operating day.

Number of operative sessions was reduced from 6 to 2 a week. Only emergency or semi emergency cases were done and number of procedures per patient was limited as much as possible. Use of allograft completely stopped as allograft harvesting without proper testing of the donors and protection of the harvesting personnel could increase the risk of transmission of infection (8). Electric dermatome was not used inside the operating theater due to the risk of aerosol generation (9,10).

Endotracheal intubation was not practised as much as possible for the fear of aggravating respiratory complication in case of undetected COVID 19 infection in the patients and also to protect the anesthesia personnel who were forced to intubate with only face shield and surgical masks (11). Intubation glass chamber is not available in the hospital.

Given the challenges noted and described above at Kirtipur Hospital in response to COVID 19 pandemic, we thought to understand the impacts of the challenges and adjustments. The aim of this study was to investigate the demography and outcome of burn patients along with changes in the practice and behaviour of BCWs involved.

#### **Methods:**

Ethical approval was obtained from Institutional Review Committee of pfect-NEPAL.

A retrospective cohort analysis of the burn injured patients admitted to Kirtipur Hospital during the period of April to August in the year 2019 and same duration in 2020 was done. Demographic and outcome data as the

number of admitted patients, patient demographics, burn characteristics and outcome were described and compared.

Additionally, a structured questionnaire was used to understand the BCW demographics, academic background, clinical role, workload, payment status, psychological concerns and occupational health issues in the light of the COVID 19 pandemic. The survey was voluntary, and was administered via a confidential and secure internet based platform.

#### **Results:**

*Patient evaluation:* A total of 192 and 139 patients were admitted in 2019 and 2020 respectively ( $p=0.57$ ). Figure 3 shows the monthly distribution of admitted burn patients during the period. Most of the months in 2019 had more patients but there were more patients in the month of July 2020.

There were more males (60% vs. 58%) in both 2019 and 2020. More than one third of the patients belonged to the age group 5-15 years, however most belonged to 15-60 years of age group. There was slight increase in flame burn and electric burn. Scald burn decreased significantly ( $p=0.01$ ) (Table 1).

#### *Burn Injury Characteristics and Outcomes:*

Extent of burn and mortality were similar before and after COVID 19 (Table 2). There were 58% of patients receiving one session of excision and grafting in 2019 vs. 27% in 2020 ( $p=0.1$ ). Less than four per cent of the patients underwent two or more sessions of excision and grafting in both 2019 and 2020. Significantly higher (8 vs. 5%) proportion of patients left hospital against medical advice in 2019 ( $p=0.04$ ). Out of the seven patients who left hospital in 2020, two were transferred to COVID 19 hospitals for further management because they had tested positive for virus.

#### *Survey on the BCW:*

Thirty seven out of 75 BCW responded to the questionnaire survey.

- i) *Demographics:* Sixty eight percent were females. Most belonged to the age group 20-30 years (Figure 4).
- ii) *Clinical role:* Most of the respondents were the nurses/health assistants and worked in burn operating rooms (OR). Most of them had graduate level education (Table 3).

**Table-I***Patient demographics and causes of burn*

Year	Total Patients	Gender		Age Group (Year)			Etiology			
		Male	Female	0-15	15-60	60+	Flame	Scald	Electric	Others
2019	192	115	77	70	107	15	91	59	34	8
2020	139	81	58	55	77	7	75	31	30	3
Total	331	196	135	125	184	22	166	90	64	11

**Table-II***Extent and mortality of burn*

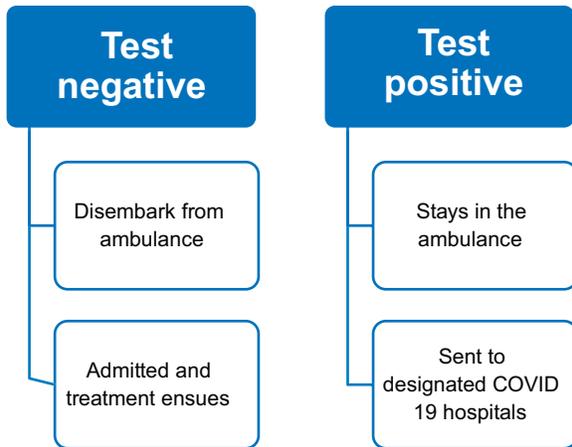
Year	TBSA of all patients (range)	Mortality (%)	TBSA of deceased patients
2019	20%(1-85)	20	20%(10-85)
2020	18%(1-90)	18	18%(10-90)
P value	0.16	0.1	0.16

**Table-III***Qualification and job role*

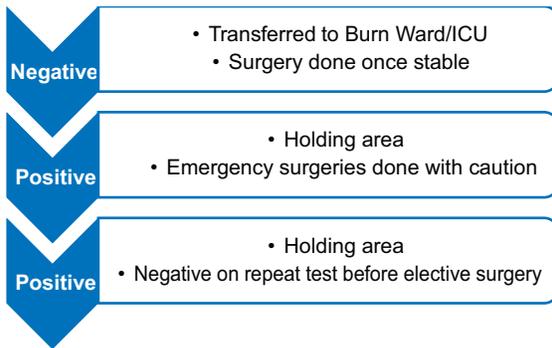
Post graduate	Qualification (% of BCW)		Job role (% of BCW)			Working station (% of BCW)			
	Graduate	Higher school	Plastic Surgeons	Nurse / HA	CMA/ ANM	O R	Burn ward	Other ward	Burn ICU
27	41	24	16	51	8	38	21	16	13

**Table-IV***Workload*

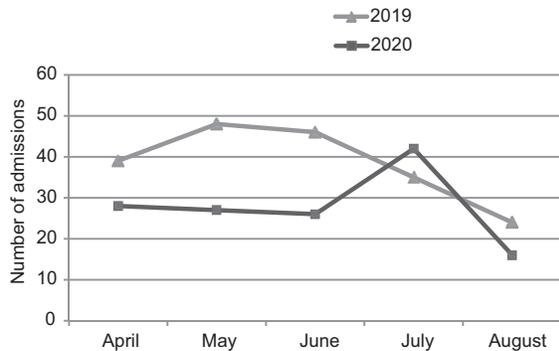
Perceived number of patients			Workload				Work days per week				Shift (hours)		
Same as before	Decrease by less than 25%	Decrease by 25-50%	Increased	Same as before	Decreased by up to 25%	Decreased by 25-0%	3	4	5	6	6-8	8-12	12+



**Fig.-1:** Flow chart during initial lockdown period when only antigen test was available

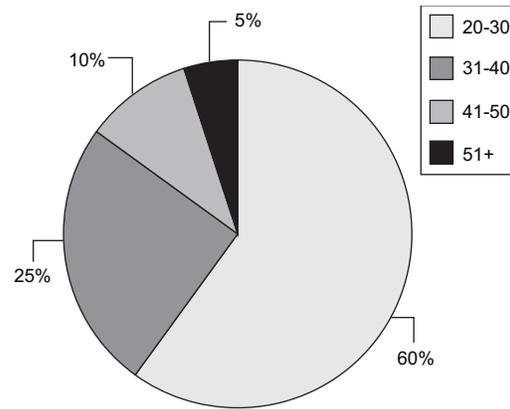


**Fig.-2:** Flow chart during the later part of lockdown with PCR test available



**Fig.-3:** Monthly distribution of burn admissions

Thirty eight percent of the respondents had been working for 2-5 years after qualification, 22% for 1-2 years, 14% for 5-10 years, 11% since 15-20 years and 8% for less than one year. Thirty four percent



**Fig.-4:** Age distribution of burn care personnel (BCP)

started seeing burn patients since 2-5 years, 23% since less than a year, 17% since 1-2 years and 5-10 years.

Fifty eight percent of the respondents admitted that more than three fourth of their practice consisted of burn care, 14% had half to three fourth of their practice consisting burn care. Forty percent of the respondents were happy to be able to help burn patients, 30% found the job okay, 11% each of the respondents either felt positive or inspired about their job. Overall, 92% of the respondents were happy with their job. Despite that most of the BCWs were not happy with their pay (79%) and equal number was unhappy because of bad outcome of patients and professional insecurity (38%).

- iii) *Workload:* Most felt that the number of patients had remained the same and workload remained the same or increased. Most BCW worked 4 days a week and 6-8 hours shifts (Error! Reference source not found.). Almost 58% of the respondents were getting half salary, 31% were getting three fourth salary and only 11% were getting full salary.
- iv) *Psychological concerns:* Most common concern during this pandemic was transmitting infection to the family members (76%), getting themselves infected (65%), getting pay cuts (54%), discrimination from the landlord, neighbors or the society (38%) and fear of death of family and relatives (30%).
- v) *Virtual trainings:* Half of the respondents took part in the virtual educations similar to or more than

before the lockdown. Another one fourth did not know about such trainings. Most wanted to hear about issues such as psychological and professional security (69%) and other more relevant topics (58%), half of them wanted more interactive sessions. Fifty three percent of the respondents who did not attend such trainings reported this was due to being busy at work.

- vi) *Safety measures adopted after the lockdown:* Most common behavioral changes involved use of mask and hand washing in 97% of the cases, use of sanitizer in 95%, avoidance of shaking hands and hugging (78%) and use of PPE (43%). Twenty nine percent of them had access to standard PPE with face shield and shoe-covers to see COVID 19 suspected patients, 40% had access to locally made and sterilizable level II PPE, 26% had only mask and gloves while another 6% had only regular cloth gown. KN 95 mask was the most widely used mask (62%), followed by surgical mask (32%) and N 95 (5%). Most of the respondents bought the mask themselves (72%), 14% were provided by hospital and 11% were bought by the patient families. Mask was changed once a week by 35% of the respondents, 2-3 times a week by 32%, 22% of the respondents got new mask every time they were in hospital, 11% did not change mask until they got a new one. Outside the operation theater, unsterile gloves were used most of the times (86%) out of which 19% were recycled.
- vii) *Occupational health:* Most of the respondents were not clear about hospital protocol regarding management of health care worker in case of work related infection. Forty nine percent of the respondent felt that they would be sent to home quarantine if they got infected, 35% had no idea what would happen to them, 32% thought PCR test would be done to them, 24% thought they would be sent to isolation and 3% thought they would be laid off. Out of 15 BCW who had either suspicion or diagnosis of COVID 19 infection, 10 had PCR test, 3 were sent to home quarantine and 2 (who positive) were sent to isolation. All recovered in the end.

#### **Discussion:**

Given that burn patients can also have or acquire asymptomatic COVID 19 infection treating patients

based on an initial negative test result without proper protection can risk both patients and staff. Significant presence of false negative tests should always be taken into consideration and universal protective measures should be taken<sup>12,13</sup>. High risk procedures in suspected COVID 19 burn patients include establishing intravenous access, endotracheal intubation or tracheostomy, wound treatment, and surgery. The implementation of effective, appropriate-grade protection and development of practical treatment procedures are necessary to protect BCWs<sup>14</sup>.

Contrary to the reports from other parts of the world (15), number of burn admissions did not decrease significantly in our center. The community burn incidence might be increasing due to increase in domestic burns in our set up as people are forced to spend more time at home due to the national lockdown. It is probably reflected better in places where mobility of patients is not restricted<sup>16</sup>. Decrease in the mobility may have resulted in slight decrease in the number of despite hypothetical increase in the incidence. Increase in the number of admissions in the month of July can be related to the partial lift off of the lockdown in the country allowing movement of patients from different parts of the country to our hospital. It may also be related to the fact that other centers that typically also care for burn patients are busy taking care of COVID 19 cases<sup>17</sup>.

Most literature from LMIC demonstrate higher incidence of burns in female patients and adults are the most commonly involved age group<sup>18,19</sup>. Earlier reports from our center also showed female prevalence<sup>20,21</sup>. However, the shift towards increased male prevalence was noticed both immediately before and during pandemic. Commonest age group of our patients is similar to other studies and there was no change during the pandemic. No increase in incidence of burn in pediatric age group was seen as reported elsewhere<sup>16</sup>. Flame burn was the commonest cause of burn in our study which is similar to other reports from our center and elsewhere<sup>18-23</sup>. Scald seemed to decrease significantly in our study. This may be attributed to the fact that most of the scald burns were either not extensive or likely to be managed locally or in outpatient. This could also be due to more stringent admission criteria.

No significant difference in average TBSA was seen before and during pandemic. This is expected as the

etiology of burn remained the same. The number of procedures per patient was kept to minimum. Only emergency and semi emergency cases were taken to the operation theater. Similar trend has been seen or recommended from other centers<sup>7,13,24</sup>. Mortality rate was also unchanged before and after the pandemic. Our hospital was not involved in taking care of COVID 19 infected burn patients. Two of the admitted burn patients with positive tests were referred to COVID 19 hospitals. Fewer patients left hospital against medical advice probably in association with decreased mobility due to the national lockdown. This trend is seen also during normal circumstances.

One third of the BCW respondents had spent 2-5 years caring for burn patients. This coincides with the fact that the hospital started its burn service 6 years back. Almost three fourth of the respondents devoted half to three fourth of their time in taking care of burn patients; this is not unusual in a place which is a multispecialty hospital. More than 90% of the respondents were happy with their job despite the fact that almost 80% felt that their pay was inadequate. Almost a quarter of BCWs felt overworked after the lockdown due to staff cut down (cohorting) and long working hours. Only 27% worked 6 days a week however 30% worked 8-12 hours shift while 16% worked more than 12 hours a day. Fifty eight percent of the BCWs were getting half the salary and 31% were getting three fourth the salary. These factors along with the need to work with potential COVID 19 patients can lead to psychological burn out in the BCWs as shown elsewhere<sup>25-27</sup>. Same is true for the burn care doctors<sup>28</sup>.

Fear and psychological stress has been found across the general population<sup>29</sup>. Most common concern among our study population was fear of transmitting infection to the family member (76%) or themselves (65%). Half of them feared ongoing salary reduction and one third were worried about discrimination from the society. Fear of death was also present in one third of the BCWs. Fear has been demonstrated in frontline Filipino nurses taking care of COVID 19 patients. Increased level of fear has been associated with increased psychological stress, job satisfaction and increased turnover intention<sup>30</sup>.

Only half of the respondents in our study participated in ongoing virtual trainings; the remaining half either cited a lack of availability or lack of awareness of the

training. Significant proportion of BCWs (60-70%) wanted these meetings to address issues such as psychological and professional security as shown in other study<sup>31</sup>. Virtual trainings and recordings may be a reasonable and accessible format for BCW to receiving additional psycho-social training and support.

Most common behavioral change after the lockdown was use of sanitizers and hand washing by almost all of the BCWs. Physical distancing measures such as avoidance of hugging shaking of hands were brought into practice by more than three fourth. Less than a third had access to standard PPE with face shield, KN 95 mask and boot to see a COVID 19 suspected patient. Locally made sterilizable level II PPE was being used by 40% of the BCWs during surgery and dressing changes. Access to masks was limited and they were being used for longer than recommended<sup>32</sup>. Unsterile gloves were used in most instances (86%) except surgery and they were being recycled in 11% of the cases. Recycling was not done previously in our center. Recycling of gloves was started because of its positive environmental and economic implications as reported by Choudhury<sup>33</sup>.

#### **Limitations of the study:**

We were able to enroll less than half of the BCW despite keeping the questionnaire simple and anonymous. Most of them were young, well educated and more likely to respond to internet based survey than their older colleagues. The study focuses only on the first five months when the lockdown was enforced more rigorously. It does not represent the winter months when most burn patients come to our center. However, we also took the same period of time from the last year for comparison.

#### **Conclusion:**

Number of admissions and etiology of burns remained the same. TBSA of burn and mortality also remained same. Surgery was being done less frequently to avoid anesthesia related complications to the patients and also to decrease the rate of transmission to the BCWs. Out of hospital transfer of patients also reduced. Most of the BCWs were adopting hand washing and use of sanitizers; physical distancing measures were being practiced. Gross shortage of PPE and masks was noted by most. Most of the BCWs were overworked and underpaid after the lockdown leading to psychological burn down and occupational insecurity. Most were

worried about getting themselves or their family members infected; some feared death and discrimination. Only half participated in virtual trainings and they wanted psychological and occupational issues to be addressed in such trainings.

### Recommendations:

The current pandemic appears it will be a presence and reality for many months if not years. We have to take it as a new normal and learn to live with it. In a time when health care facilities are suffering economic crisis like other sectors (34–36), the constant flow of burn patients provides unique opportunity not only to provide care to maximum number of patients which is not available in other facilities due to the pandemic but also helps to financially support the institution. This in turn will help pay the BCW and reduce the risk of lay off. However, in order for the burn care system to continue to function, the need of BCW and patients along with their families has to be addressed well. It can be done through implementation of proper safety protocol and availing standard PPE at commonly needed locations. BCW also need psychological support besides adequate pay and safety measures to enhance the output. Psychological support can be achieved through frequent virtual trainings and appropriate levels of encouragement by the colleagues and authority.

Conflict of interest:

The authors have no conflict of interest.

### Acknowledgements:

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