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Knowledge, Practices and Attitude of Health Care Support Personnel on COVID-19: A Comparative Study Bhutan and Sri Lanka

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Authors' contributions

This work was carried out in collaboration among all authors. Author DD, the principal investigator, developed the research concept, proposal writing and was involved in the data collection in Bhutan, the verification of the accuracy of data, funding in Bhutan study and the preparation of the final document. Author TD aided with the data collection in Sri Lanka and verification of the accuracy of data. Author PJ, the corresponding author, has contributed proposal writing, supervision of the data collection, the verification of the accuracy of data, funding in Sri Lanka study and the preparation of the final document. All authors read and approved the final manuscript.

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ABSTRACT

Background: Health care support personnel are more vulnerable to COVID-19 due to the nature of their work. Their comparatively lower education qualifications, the important service they provide and associated risks of infection to themselves and others are high. This study attempts to explore and compare the knowledge, practices, and attitude of health care support personnel in Bhutan and Sri Lanka.
Methods: A descriptive cross-sectional study using a purposive stratified sampling method with a questionnaire administered on knowledge, practices, and attitude was conducted from September 2020 to June 2021. The analysis was run using SPSS 21.

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Results: There were 775 (383 Sri Lankans, 392 Bhutanese) respondents. They consist of attendants (204), health care assistants (labourers) (355), cleaners (140), ambulance drivers (35) and security guards (41). Their levels of education were Grade 12 (24.5%), Grade 10 (41.2%), Grade 8-5(22.2%), and no formal education (12.1%). The majority (66.3%) had a 'good' knowledge level of COVID-19. Sri Lankan and Bhutanese mean knowledge score is 7.55 and 7.44 respectively ($p<0.05$). Overall, not much difference is observed in Practice related to COIVD-19 in both countries. Sri Lankans reported less fear of contact with COVID patients than Bhutanese ($p<0.05$), but more Bhutanese feel safe at work than Sri Lankans ($p<0.05$). More Bhutanese (90.8%) report satisfaction with measures taken by their hospital compared to Sri Lankans (49.3%).

Conclusion: Sri Lanka reports slightly higher knowledge test means compared to Bhutan. While more Bhutanese report fear of contact with COVID-19 patients, more Bhutanese report satisfaction with measures taken by their hospitals for their safety, comparatively. It is important to explore the low levels of appreciation perceived, fears reported, and study ways to improve the psychological well-being of healthcare support staff.

Keywords: COVID-19; healthcare support personnel; Bhutan; Sri Lanka; knowledge; practice; attitude.

1. INTRODUCTION

The year 2020 has proven to be the most challenging in health in the last century. The vulnerability of health care workers during the pandemic and the need to protect this essential human resource has been stressed [1]. A healthcare worker delivers care and services to the sick and ailing either directly as doctors and nurses or indirectly as aides, helpers, laboratory technicians, or even medical waste handlers. There are approximately 59 million healthcare workers worldwide [2]. Health care workers are more vulnerable to COVID-19 due to the nature of their work in a pandemic situation [3]. Exposure to the virus poses a constant threat to healthcare workers; a group that has faced unprecedented levels of morbidity and mortality worldwide [4]. Health care workers from many parts of the world do not have sufficient access to personal protective equipment (PPE). Some nations face shortages while others amass surpluses [5]. Support personnel like cleaners are often low in precedence to receive PPE although equally exposed [6]. There is a gap in studies conducted on health care support personnel after the start of the COVID-19 pandemic.

Most studies focus on the knowledge, attitude, practice and perceptions of doctors and nurses during the pandemic and hardly any studies focusing solely on health care support personnel [4].

Lack of proper training of hospital support staff on COVID-19, have been reported and concerns have been expressed by healthcare support personnel who fear exposing their family to the virus due to their work [7].

A scoping review to estimate COVID-19 infections and deaths in healthcare workers from a global perspective reported the highest infections amongst nurses and highest deaths in doctors. The review also reported higher infection for the support staff 6.8% (n = 1899) compared to administrative staff: <0.1% (n = 27). Higher death rates were reported for support staff 7.2% (n = 74) compared to administrative support staff 2.8% (n = 29) [6].

Knowledge on COVID-19 directly affected the attitudes and practices of health care workers, where healthcare workers with greater knowledge were more confident in defeating the virus and misunderstandings and inadequate knowledge lead to late diagnosis, poor infection control practices and intra-hospital transmission of the communicable disease [8,9]. Health care support personnel have expressed their opinions on the lack of respect for their jobs despite being essential workers [10,11].

There are differences in job descriptions in each category among different countries. Bhutan's main employees in the health care support category were attendants where they perform most of the duties of the Sri Lankan health care assistants (labourer) category and Sri Lankan health care assistants (labourers) perform part of the cleaning done by cleaners but solely by cleaners in Bhutan. This explained the very few labourers in Bhutan and the reasonable number of cleaners and more labourers in Sri Lanka with fewer attendants. This justifies the comparisons being drawn between the occupation categories of the two countries. To have less confusion, as this study is about health care support personal, health care assistants were named as labourers with all due respect for them.

Sociodemographic characteristics: Bhutan is situated in the eastern Himalayas with a total area of 36 394 sq. km and has a population of 774 830. The country is in the medium human development index (HDI) category. Health services in the country are available through a three-tier structure: (i) basic health units (BHUs), sub-posts and outreach clinics (ORCs) at the primary level; (ii) district or general hospitals at the secondary level; and (iii) regional and national referral hospitals at the tertiary level. At present, there are three referral hospitals, 28 district hospitals including one indigenous hospital at Thimphu, 23 BHUs grade I (BHU-Is), 184 BHUs grade II (BHU-IIs), 28 sub-posts, 562 ORCs and 54 indigenous units [12].

Sri Lanka is a South Asian Island nation in the Indian Ocean and has a population of nearly 21.7 million. The total land area of the country is 65 625 sq.km and includes the main island and several small islands in close proximity to the main land mass. The country is in the high human development index (HDI)category. There are 1,104 curative care hospitals in the government health services. The network of curative institutions is made up of tertiary care institutes as national hospitals, teaching hospitals, provincial general hospitals, secondary care institutes as district general hospitals, base hospitals, and primary care institutes in peripheral units such as divisional hospitals and rural hospitals [13].

"Globally, as of 19 October 2021, there have been 240,260,449 confirmed cases of COVID-19, including 4,890,424 deaths, reported to WHO[8]". On the same day, WHO (2021) reported 2617 cases with 3 deaths in Bhutan and 531,648 cases with 13,484 deaths in Sri Lanka [14].

1.1 Objectives

Given the background, it was imperative to take the opportunity to study the knowledge, practice and attitude of this important category of personnel of the health system. It would not only allow for the rare opportunity of self-expression of this category of health care personnel but also help identify gaps in knowledge and practice which could be of direct benefit to the participants as well as to the hospital management or policy makers.

Our objective was to assess the knowledge, attitude, and practice of different categories of health care support personnel on COVID-19. And to compare the knowledge, attitude, and practice on COVID-19 amongst the different types of health care support personnel of two South Asian Countries (Bhutan and Sri Lanka).

2. METHODOLOGY

2.1 Study Design

This descriptive cross-sectional study was conducted among healthcare support personnel of Bhutan and Sri Lanka between September 2020 and June 2021.

Given the COVID-19 situation, the lockdowns, the purposive stratified sampling method was employed to target the support staff in selected hospitals (purposive sampling of hospitals due to pandemic and stratified sampling for occupation category). In Sri Lanka, Colombo South Teaching Hospital was identified and Bhutan, the three referral hospitals were selected, viz., Jigme Dorji Wangchuck National Referral Hospital (JDWNRH) in Thimphu, Central Regional Referral Hospital (CRRH) in Gelephu and Mongar Regional Referral Hospital (MRRH) in Mongar. Both referral hospitals in Bhutan and teaching hospitals in Sri Lanka provide the same tertiary care health services to the nation.

The most recent total healthcare support personnel population for the respective countries was collected from 882 from the Statistical Yearbook of Bhutan - 2019, and for Sri Lanka, 58190 from the Sri Lanka Essential Health Service Package 2019 by the Ministry of Health.

The sample size of 268 for Bhutan and 382 for Colombo was generated using the Cochran Sampling technique providing a 95% confidence level and a corresponding margin of error of 5.

For Sri Lanka, the sample size for each category of support staff was calculated in percentage based on the data on the population strength of the respective categories in the hospitals. This brings the sample size of each category of support staff to 281 Labourers (Health care assistants) (73.6%), 60 attendants (15.6%), 18 cleaners (4.7%), 13 drivers (3.5%) and 10 security personnel (2.6%) from the sample size of 382. However, while the sample size was met, the category sizes were not met.

Bhutan, given the spread of support staff over many hospitals across many districts, the population of the support staff in the three

referrals was targeted with the assumption that it will represent the population strength of the respective categories. Though sample size for Bhutan is 268, the decision to cover the population of all staff in the three referral hospitals resulted in 392 support staff being included in the study.

2.2 Inclusion and Exclusion Criteria

The sample included only health care support personnel who serve as ward attendants, labourers (health care assistants), cleaners, security guards and ambulance drivers.

The study excluded administrative staff to control for effects that may arise from administrative positions and non-administrative health care support personnel who serve in categories other than above.

2.3 Study Tool

The study employed an interviewer or self-administered questionnaire in the language of the respondents. The data was compiled on an Excel sheet and Google Form.

The questionnaire comprises 37 items. There are 9 items in the demography section, 10 items for Knowledge, 10 items for Attitude and 8 items for Practice. Of the 28 items, there are 14 'yes' 'no' response type items, eight multiple-choice items, four, Four Point Likert Scale items and two Checkbox items.

This questionnaire was face validated by a Sri Lankan physician and a microbiologist and reviewed by two Bhutanese public health specialists and the head of the Center for Research in Respiratory and Neuroscience.

The questionnaire was pre-tested with 15 support staff in University Hospital Kotelawala Defence University, Sri Lanka to test for homogeneity and reliability.

2.4 Data Collection and Statistical Analysis

Data was collected through a questionnaire administered by interviewers or self in respondents' local language after obtaining the informed verbal consent or written consent. Due to the challenges posed by the pandemic, inaccessibility and lockdowns, interviews were administered mainly over the phone in Sri Lanka and Bhutan in few cases printed self-administered questionnaire was used for respondents in quarantine/isolation or due to their work in inaccessible areas of the hospital.

As the questionnaire comprised items of varying scales and response patterns, collapsing responses to a dichotomous scale was done for analysis of reliability [15]. The final questionnaire consisting of 39 variables (including sub-questions) is found to be acceptable at α=.708.

The 7 items under Knowledge being a direct test for Knowledge on COVID-19 with one item comprising 3 sub-questions resulted in 9 variables being analyzed for the knowledge test. Similarly, other items having sub-questions were entered separately resulting in a total of 39 variables, 18 for Knowledge, 11 for Practice and 10 for Attitude excluding the 9 items on demography.

The analysis was run using SPSS-21. An alpha level of .05 was used for all statistical tests and Cramer's *V* was used to report effect size.

An exploratory descriptive analysis was run to assess the knowledge, attitude, and practice of health care support personnel on COVID-19. Descriptive crosstabs and analysis of variance was run for comparative analysis of the knowledge, attitude, and practice on COVID-19 by occupation category and by country. Post hoc analyses were conducted using Bonferroni posthoc test, where applicable.

Performance in the COVID-19 knowledge test is reported under four levels of knowledge identified (9/9 Excellent, 7-8/9 Good, 5-6/9 below average and 0-4/9 poor).

3. RESULTS

3.1 Demography

There were 775 support staff with 383 from Sri Lanka and 392 from Bhutan. More than half (66.3%) is below the age of 41 and there were more males (56.4%) than females (43.6%). Over 75% of the sample in Sri Lanka is between 31 to 60 years of age while it is between 21 to 40 years in Bhutan. Signification relation is observed between country and age range, X^2 (5, N = 775) = 80.16 (p <.05) with moderate effect V=.322. While most (83.5%) report not having or not being aware of any health conditions, of those

who reported some concerning health conditions, hypertension recorded the highest (6.1%), followed by diabetes (2.7%).

The relation between occupation category and gender was significant, X^2 (4, N = 775) = 47.64, p <.05 with small effect, V .248 (p <.05). The percentages of males and females vary in different occupation categories. All (100%) ambulance drivers were male, almost two thirds (65.9%) security guards were male and more (61.1%) labourers were male. Comparatively, more females were observed to be cleaners (56.4%) and ward attendants (52.5%).

Significant relationship, X^2 (4, N = 775) = 628.18, p <.05, was observed for country and occupation category with very strong effects, Cramer's V=.900. Huge difference in the size of occupation categories in the two countries: labourers account for a majority (91.1%) of the sample in Sri Lanka and Bhutan the least (1.5%); ward attendants account for almost half the sample (47.2%) of Bhutan while they account for a small size (5%) for Sri Lanka. Cleaners account for 1⁄3 of Bhutan's sample (33.2%) while for Sri Lanka it represents a small section (2.6%) (Table 1).

The relation between country and service type was significant X^2 (2, N = 775) = 301.63, p <.05, with strong effects, V=.624. Overall, most support staff (62.3%) were permanently employed. Most (87.5%) of the support staff in Sri Lanka were permanently employed while in Bhutan majority (60.7%) were employed on a contract basis.

Likewise significant relation X^2 (6, N = 775) = 105.74, p <.05 and moderate effects, V=.369 were observed for country and number of years in service. For service between less than a year to 10 years, Bhutan had the most (75%) staff in range, while Sri Lanka reports less than half (49.6%). For Bhutan only (25%) reported service of 11 years and more while in Sri Lanka over half (50.4%) reported service of 11 years and more.

Significant relationship, X^2 (16, N = 775) = 480.96, p <.05, and moderate effects of V.394 were observed for occupation category and level of education. Labourers appear to have the highest qualifications comparatively, with over 95% having grade 10 qualifications (52.7%) and grade 12 qualifications (43.4%). Ward attendants follow with close to half (47.1%) having grade 10 qualification, while the majority of ambulance drivers had grade 8 (42.9 %) and grade 10 (42.9%) qualifications. Comparatively, many cleaners (45%) and security guards (41.5%) had not received formal education. The relation between country and level of education was significant X2 (4, N = 775) = 301.88, p <.05, with strong effects, V=.624. In Sri Lanka, most (94.8%) report having grade 10 to grade 12 qualifications while for Bhutan just over a 1⁄3 (37.2%) had grade 10 or grade 12 qualifications. Support staff with no formal education was 92 (23.5%) for Bhutan with only two (0.5%) for Sri Lanka (Table 2).

Table 1. Occupation category by country

Occupation category	Bhutan		Sri Lanka		Total	
	n	%	n	%	n	%
Ward Attendant	185	42.7	19	5.0	204	26.3
Cleaner	130	33.2	10	2.6	140	18.1
Healthcare Assistant (labourer)	6	1.5	349	91.1	355	45.8
Ambulance Driver	30	7.7	5	1.3	35	4.5
Security Guard	41	10.5	0	0	41	5.3
Total	392	100	383	100	775	100

Table 2. Education level by country

Education level	Bhutan		Sri Lanka		Total	
	n	%	n	%	n	%
No formal education	92	23.5	2	0.5	94	12.1
Grade 5	47	12	4	1.0	51	6.6
Grade 8	107	27.3	14	3.7	121	15.6
Grade 10	113	28.8	206	53.8	319	41.2
Grade 12	33	8.4	157	41.0	190	24.5
Total	392	100	383	100	775	100

Most support staff (45.5%) spend 6-8 hours a day at work. Significant relationship, X^2 (12, N = 775) = 376.22, p <.05, was observed for occupation category and hours spent at work. The majority of ambulance drivers (48.6%) had longer working hours of more than 12 hours a day compared to the other occupation categories. Next to ambulance drivers, most security guards (58.5%) work between 9-12 hours a day. Significant relationship, X^2 (3, N = 775) = 244.26, p <.05, was observed for country and hours spent at work with strong effects, V=.561. In Sri Lanka, the majority (63.4%) spend between 9-12 hours at work in a day compared to only 12% in Bhutan. The majority (59.2%) in Bhutan spend between 6-8 hours at work in a day. However, the number of spending over 12 hours at work in a day was reportedly higher for Bhutan (11.2%) than Sri Lanka (4.7%).

3.2 Training Self-Perception and Readiness

The findings have been reported separately since it is not a direct question testing knowledge but provide an indication of knowledge due to training availed.

Of the training, most (85.4%) had received proper hand washing training, followed by training on proper face mask use (80.3%). Over half the sample (54.5%), perceived themselves to be prepared for when the local transmission started in the country.

The training provided by the hospital show a positive and significant association with the country. Overall, more support staff in Bhutan reportedly have received more training compared to the support staff in Sri Lanka (Table 3).

Exploring the relation between country and respondents self-perception of readiness when the local transmission started, shows a significant association at X2 (2, N = 775) = 141.09, p <.05, with close to strong effects, V=.427. More respondents in Bhutan (74.7%) think they were prepared for the scenario when the local transmission started compared to the staff in Sri Lanka (33.7%).

However, exploring respondents' self-perception of readiness when the local transmission started to their COVID-19 knowledge test scores indicates that respondents who perceive not to be ready for the pandemic had higher test scores. The analysis of variance showed that not all means of knowledge test scores were the same and there is a significant relationship between self-perception of readiness when the local transmission started on mean knowledge test scores of support staff (F 2, 772 = 8.34, p <.05). Out of a total knowledge test score of 9, there is 95% confidence that the mean test score of support staff who reported they were not ready for the pandemic is between 0.01 and 0.45 scores higher than the mean test score of those who reported they were ready and 0.19 and 0.75 scores higher than the mean test score of those who reported they were not sure of their readiness.

3.3 Knowledge

Based on the performance in the COVID-19 knowledge test and the associated four levels of knowledge, most (63.6%) of the support staff fall under level 'Good'.

Signification but weak effects were observed for occupation category and knowledge level, X^2 (12, N = 775) = 62.03, p <.05, and V=.163. The majority of labourers (90.4%) fall in 'Excellent' and 'Good' categories, followed by ward attendants (88.2%), cleaners (82.1%) and security guards (75.7%). Ambulance drivers report lower knowledge levels with 42.9% shows average in poor levels of knowledge (Table 4).

There was evidence that not all means of knowledge test scores were the same and there was a significant effect of occupation categories on mean knowledge test scores of support staff (F 4, 770 = 7.23, p <.05). Out of a total knowledge test score of 9, there was 95% confidence that the mean test score of security guards was between 0.19 and 1.17 scores lower than the mean test score of labourers and between 0.13 and 1.15 scores lower than ward attendants. Also, the mean test score of labourers was between 0.06 and 0.65 scores higher than the mean test score of cleaners (Table 4).

The relation between country and knowledge level is significant X^2 (3, N = 775) = 8.98, p <.05 but with weak effects, V=.108. Slightly higher percentages of the support staff of Sri Lanka in Excellent and Good levels and higher percentages of the support staff of Bhutan in the Below average and Poor levels, comparatively. The difference of 0.19 in the mean knowledge test scores of support staff by country is significant (F 1, 773 = 5.59, p <.05) (Table 5).

Table 3. Training provided by hospitals and association with the country

Training received	Bhutan		Sri Lanka		Relationship	Effect Size
	n	%	n	%	X^2 (1, N = 775) =	Cramers *V*
Proper handwashing technique	376	95.9	286	74.7	70.20*	.301*
Social distancing during and after duty	369	94.1	180	47	208.35*	.518*
Proper use and disposal of gloves	333	84.9	170	44.4	139.93*	.425*
Proper use of sanitiser	347	88.5	176	46	159.97*	.454*
Do's and don'ts to protect yourself	282	71.9	137	35.9	101.40*	.362*

*Note *p<.01*

Table 4. Knowledge test score over 9 - different categories

	N	Mean	Std. Deviation	Std. Error	95% confidence interval for mean		Min	Max
					Lower Bound	Upper Bound		
Ward Attendant	204	7.74	1.121	.079	7.59	7.89	3	9
Cleaner	140	7.42	1.060	.090	7.24	7.60	4	9
Healthcare Assistant	355	7.78	.956	.051	7.68	7.88	5	9
Ambulance Driver	35	7.26	1.442	.244	6.76	7.75	4	9
Security Guard	41	7.10	1.261	.197	6.70	7.50	3	9
Total	775	7.64	1.079	.039	7.57	7.72	3	9

Table 5. Knowledge Test Score over 9 - comparison in both countries

	N	Mean	Std. Deviation	Std. Error	95% confidence interval for mean		Min	Max
					Lower bound	Upper bound		
Bhutan	392	7.55	1.156	.058	7.44	7.67	3	9
Sri Lanka	383	7.74	.987	.050	7.64	7.84	4	9
Total	775	7.64	1.079	.039	7.57	7.72	3	9

3.4 Attitude

While more support staff (57%) fear COVID-19, fewer (40.1%) reportedly fear contact with COVID-19 patients. While the majority (79.1%) report feeling safe at work, many (75.5%) reportedly fear exposing their family to COVID-19 because of their work at the hospital. Almost all (92.8%) perceived their work to be important to some degree. More (60.6%) feel that their work was appreciated by other health workers than by the public (46.2%). Some support staff (22.3%) blame China for the spread of the disease (Table 6).

A significant relationship with X^2 (8, N = 774) = 258.58, p <.05, and moderate effects *V*.409 was observed for occupation category and fear of contact with COVID-19 patients. The majority of security guards (80.5%), cleaners (77.9%) reportedly fear contact with COVID-19 patients, while most labourers (80.5%) and ambulance drivers (60%) did not fear contact with COVID-19 patients. Thus, concerning the previous finding on labourers and drivers working more in close contact with COVID-19 patients, fear appears to be higher in those categories that did not have much contact with the patients.

Overall, the analyses of attitude items show significant associations with country. A significant relation X^2 (2, N = 774) = 132.34, p <.05, with moderate effects, was observed, *V*.413 was observed for fear of COVID-19 and country. More staff in Bhutan (77%) report fear of COVID-19 compared to Sri Lanka (36.4%). The association between fear of contact with COVID-19 patients and the country was significant at X^2 (2, N = 774) = 267.48, p <.05, with strong effects, *V*.588. More staff in Bhutan (68.1%) reported fear of contact with COVID-19 patients compared to Sri Lanka (11.3%).

Table 6. Attitude and association with the country

Staff Attitude	Bhutan			Sri Lanka			Effect size	Relationship
	Yes n (%)	No n (%)	Don't Know n (%)	Yes n (%)	No n (%)	Don't Know n (%)	X^2 *p <.05	Cramers V *p <.05
Fear of COVID-19	302 (77.0)	77 (19.6)	13 (3.3)	139 (36.4)	222 (58.1)	21 (5.5)	X^2 (2, N = 774) = 132.34	.413
Fear of contact with COVID-19 patients	267 (68.1)	102 (26.0)	23 (5.9)	43 (11.3)	310 (81.2)	29 (7.6)	X^2 (2, N = 774) = 267.48	.588
Fear of exposing family to COVID-19	326 (83.2)	66 (16.8)	_	259 (67.7)	124 (32.4)	_	X^2 (1, N = 775) = 25.28	.181
Feeling safe at work	336 (85.7)	56 (14.3)	_	277 (72.3)	106 (27.7)	_	X^2 (1, N = 775) = 21.01	.165
Satisfaction with the measures taken by hospitals for protection	356 (90.8)	7 (1.8)	29 (7.4)	188 (49.3)	88 (23.1)	105 (27.6)	X^2 (2, N = 773) = 163.93	.461
Perception: an appreciation by other health workers	313 (79.8)	17 (4.3)	62 (15.8)	157 (41.0)	108 (28.2)	118 (30.8)	X^2 (2, N = 775) = 135.36	.418
Perception: appreciation by the public	228 (58.2)	47 (12.0)	117 (29.8)	130 (33.9)	103 (26.9)	150 (39.2)	X^2 (2, N = 775) = 51.72	.258

Significant relationship, X^2 (1, N = 775) = 21.01, p <.05, is observed for country and feeling of safety at work, with weak effects, V=0.165. Comparatively, more support staff in Bhutan (85.7%) reportedly feel safe at work compared to support staff in Sri Lanka (72.3%).

Significant relationship, X^2 (1, N = 775) = 25.28, p <.05, was observed for country and fear of exposing family to COVID-19, with weak effects, V=0.181. More support staff in Bhutan (83.2%) reportedly fear exposing their family to COVID-19 compared to support staff in Sri Lanka (67.6%).

A significant relation X^2 (2, N = 773) = 163.93, p <.05, with moderate effects, V.461 was observed for satisfaction with measures taken by the hospital. More support staff in Bhutan (90.8%) report satisfaction with measures taken by their hospital compared to support staff in Sri Lanka (49.3%).

While there was significant relation X^2 (3, N = 775) = 10.14, p <.05 for self-perception on importance of one's work during the pandemic and country, the effect size was weak, V.114.

A significant relation X^2 (2, N = 775) = 135.36, p <.05, with moderate effects, Cramer's V.418 was observed for self-perception on appreciation of their work by other health workers and country. More support staff in Bhutan (79.8%) reported a perception that their work was appreciated by other health workers. Comparatively, less than half the support staff (41%) in Sri Lanka reported the same, some (28.2%) are of the perception that their work was not appreciated by other health workers and close to a third (30.8%) were unsure of the appreciation factor.

A significant relation X^2 (2, N = 775) = 51.72, p <.05, with weak effects, V.258 was observed for perception on appreciation of one's work by the public and country. More support staff in Bhutan (58.2%) reported a perception of appreciation of their work by the public compared to support staff in Sri Lanka (33.9%).

While there was significant relation X^2 (1, N = 773) = 10.55, p <.05 for holding China responsible and country, the effect size was weak at Cramer's V.117.

A significant association X^2 (2, N = 775) = 78.46, p <.05, with moderate effects, V.318 was observed for self-perception on criticism/isolation by family/friends and country. Comparatively, more staff in Sri Lanka (34.5%) report a perception of being criticized/isolated by family/friends compared to Bhutan (21.9%).

3.5 Practice

For occupation category and working in close contact with COVID-19 patients both significant relation X^2 (4, N = 774) = 70.17, p <.05, with moderate effects were observed, V.301. The highest percentage working in close contact with COVID-19 patients were ambulance drivers (77.1%) and labourers (61.3%). Comparatively, approximately only ⅓ of ward attendants (34.8%) and cleaners (37.9%) report working in close contact with COVID-19 patients. The category that had worked the least in close contact with COVID-19 patients was security guards (19.5%).

While most support staff (93.6%) reportedly wear a mask all the time at work, many (63.3%) report some difficulty working with a mask. The highest occurrence of handwashing was after handling things (73.9%) and lowest after cleaning (54.2%). However, response pattern to handwashing practices appears to be suggested by the occupation category and the associated nature of work. Majority (79.7%) report using more than two pairs of gloves a day. Over half the sample (59.2%) report increased work hours after the pandemic and a higher number (63.8%) report being more tired now than before the pandemic.

A significant relation was observed for occupation category and handwashing after handling a patient X^2 (4, N = 771) = 118.09, p <.05, with moderate effects V.391; Significant relation was also observed for occupation category and handwashing before handling a patient X^2 (4, N = 771) = 107.99, p <.05, with moderate effects V.374. The relation between occupation category and handwashing after cleaning was significant X^2 (4, N = 771) = 232.29, p <.05, with strong effects V.549. The occasions for hand washing appear to be suggested by the nature of work. Compared to other occupation categories, those having higher contact with patients report higher percentages of washing hands after handling patients and before handling patients; ward attendants (86.8%) and (70.1%); labourers (75.9%) and (67.6%); ambulance drivers (85.7%) and (88.6%). For handwashing practice after cleaning, cleaners record the highest percentage (95.7%). Of all categories and on all occasions, security guards appear to practice handwashing the least.

While the analysis of practice items by country was significant, the effect sizes were weak. Significant relationship, X^2 (2, N = 775) = 7.23, p <.05, was observed for country and regularity of mask use, with weak effects, V=0.97. Similarly, a significant relationship, X^2 (3, N = 774) = 25.81, p <.05, was observed for country and difficulty experienced in using a mask with weak effects, V=0.183.

Significant relationship, X^2 (1, N = 771) = 5.01, p <.05, was observed for country and practice of handwashing after handling a patient with negligible effects, V=0.025.

Significant relationship, X^2 (1, N = 771) = 14.54, p <.05, was observed for country and practice of handwashing before handling a patient with weak effects, Cramer's V=0.137.

Exploring the relation between country and practice of handwashing after cleaning, reported significant association at X^2 (1, N = 771) = 119.1, p <.05, with moderate effects, V=.393. While most staff in Bhutan (73.5%) reported washing hands after cleaning, most in Sri Lanka (65.7%) reportedly do not practice handwashing after cleaning. The association between country and practice of handwashing after handling things was not significant at p =.845. Significant relationship, X^2 (3, N = 775) = 8.14, p <.05, was observed for country and number of pairs of gloves used in a day with very weak effects, V=0.043.

Significant relationship, X^2 (1, N = 774) = 46.55, p <.05, was observed for country and working in close contact with COVID-19 patients with weak effects, V=0.245. Comparatively, more staff in Sri Lanka (61%) report having worked in close contact with COVID-19 patients compared to Bhutan (36.5%).

Significant relationship, X^2 (1, N = 775) = 4.70, p <.05, was observed for the country and increase in work hours after the pandemic with very weak effects, V=0.078. The association between country and tiredness levels after the pandemic was not significant at p =.906. The association between country and avoiding work during the pandemic was not significant at p =.058.

4. DISCUSSION

The study reported overall good knowledge on COVID-19 for healthcare support staff. Labourers and ward attendants reported better knowledge levels and higher knowledge test score means compared to the other three categories. This result may be explained by the finding on the higher education qualifications observed for labourers followed by ward attendants.

While ambulance drivers and security guards report longer working hours a day compared to other occupation categories, overall, over half the support staff report increased work hours during the pandemic and higher numbers report increased tiredness than before the pandemic.

Of all the occupation categories, labourers consistently report the least training availed. This finding may be beneficial for Sri Lanka as 99% of all labourers in the study were from Sri Lanka.

Of all categories, security guards reported the least hand washing instances and least contact with COVID-19 patients at work and the lowest knowledge test score means.

The categories having less contact at work with COVID-19 patients, i.e., security guards and cleaners fear contact with COVID-19 patients more than other categories.

Comparatively, Bhutan had a younger healthcare support staff. This may explain why.

Sri Lanka also had support staff with more years of work experience by comparison.

By country, Sri Lanka accounts for 99% of all labourers and accounts for 91.1% of the total sample from Sri Lanka. This affects the country comparisons for this category of support staff. This finding reports very strong effects of country on occupation category. Though Bhutan had more attendants in hospitals, their work task is part of labourer work in Sri Lanka and cleaners in Bhutan do part of labourer work which we can justify.

The employment status of the majority of the staff is permanent in Sri Lanka while it is on contract in Bhutan. These findings reported very strong effects of country on employment status.

Education qualifications attained were higher for staff in Sri Lanka compared to that of staff in Bhutan. These findings reported very strong effects of country on education level.

Working hours were comparatively longer for labourers in Sri Lanka. This finding reported strong effects of country on working hours.

The mean knowledge test score for Sri Lanka (7.74) was slightly higher than that of Bhutan (7.55). Indian health care workers cross sectional study, overall adequate knowledge stated as 82.9% but only 19.4% were the non-professional health care workers where all our participants were belongs to non-professional staff [13]. In Peshawar, Pakistan study had good overall knowledge about COVID-19 (90.7%) and that is also among professional health care workers [16].

More support staff in Bhutan report having received different training compared to support staff in Sri Lanka. The effect of the country on the different training was significant with moderate to strong effects. This may corroborate the finding that more staff in Bhutan also report satisfaction with the measures taken by the hospital for their protection. The effect of the country on the satisfaction level was significant with moderate effects. Most support staff (93.6%) in this study, wear a mask all the time at work and practice handwashing (73.9%) which similar to the Indian and Pakistan study where the participants following safety practices most of the time ranged between 77.5 - 96.1% and 80-90% respectively [16,17].

More support staff of Bhutan reported preparedness for local transmission scenarios compared to the support staff of Sri Lanka. To be noted here was the finding that comparatively, more respondents with lower knowledge levels report being prepared for local transmission scenarios compared to those with higher knowledge levels. While the Dunning-Kruger effect (Kruger & Dunning, 2000) may be referred to in the case of low knowledge levels reporting high self-perception of preparedness, the training provided by the hospitals in Bhutan may explain this anomaly as the effect of the country on preparedness for local transmission scenario was significant with moderate effects.

Fear of COVID-19 and fear of contact with COVID-19 patients were comparatively higher for support staff in Bhutan than for support staff in Sri Lanka. The perception that their work was appreciated during the pandemic by other healthcare workers was higher among support staff in Bhutan than among support staff in Sri Lanka. The perception that they were criticized/isolated by family/friends because they work in the hospital during the pandemic was higher for support staff in Sri Lanka compared to support staff in Bhutan.

5. CONCLUSION

Given the important services rendered by the frontline support staff personnel, this study attempts to explore the knowledge, practice and attitude of health care support personnel and help identify gaps in knowledge and practice which may be of direct benefit to the participants as well as to the hospital management or policy makers.

The study reports overall good knowledge on COVID-19 is reported for healthcare support staff with higher mean knowledge test scores for healthcare assistants and ward attendants by occupation category and by country, slightly higher mean knowledge test scores for Sri Lanka compared to Bhutan. These finding reports very strong effects of country on education level. Comparatively, those with higher scores in the COVID-19 knowledge test report less preparedness for local transmission than those with lower scores. On COVID-19 related trainings provided by hospitals, by occupation category, healthcare assistants report receiving the least trainings, and by country Bhutan reports higher numbers of support staff who received trainings compared to Sri Lanka. This finding may be beneficial for Sri Lanka as 99% of all labourers in the study are from Sri Lanka.

Practice appears to be associated with occupation category and the nature of work, with security guards reporting the least instances of hand washing as well as the least contact with COVID-19 patients. The association for practice items by country though significant, report weak effects.

Attitude appears to be associated more with country than with occupation category. Security guards and cleaners who have reportedly less contact with COVID-19 patients, comparatively fear contact with COVID-19 patients more than occupation categories that report more work contact with COVID-19 patients. By country, fear of COVID-19 and fear of contact with COVID-19 patients is reported by more support staff of Bhutan than Sri Lanka. More support staff in Bhutan express satisfaction with measures taken by the hospital for their safety compared to Sri Lanka. Comparatively, more support staff in Bhutan perceive appreciation of their work by other health workers. Higher numbers of support staff in Sri Lanka perceive criticism/isolation by family/friends due to their work in the hospital compared to support staff in Bhutan.

6. RECOMMENDATIONS

Labourers report the lowest numbers for having received training. Being one of the largest occupation categories, with the highest levels of qualifications and working in close contact with COVID-19 patients comparatively more than other categories, relevant training is suggested for this important category of support staff.

There is a pertinent need to explore ways to demonstrate appreciation for the service contributed by the healthcare support personnel by the respective health systems and hospitals if not by the public.

Explore ways to improve mental health and psychological well-being of healthcare support staff in addition to COVID-19 information related training.

Future studies with the impact of COVID-19 related trainings on fear of COVID-19 and fear of contact with COVID-19 patients amongst healthcare support staff.

Explore factors contributing to healthcare support staffs' perceptions of low levels of appreciation during the pandemic.

7. LIMITATIONS

The purposive sampling of the hospitals may compromise generalizability to all medical support personnel of the country. However, given that the sample size is derived from the total population of support personnel and given the assumption of common norms and practices within hospitals of the same country, the issues related to purposive sampling may be minimized. However, the sample size for each occupation category in Sri Lanka is not met. Hence, the difference in the size of the occupation categories may compromise comparisons by occupation categories and by country especially for those categories that have large differences in numbers.

Also, that data was collected at different intervals of time in different countries may compromise the findings.

ETHICAL APPROVAL AND CONSENT

Ethical clearance was obtained from the Ethics Review Committee of Faculty of Medicine, General Sir John Kotelawala Defence University (KDU) (RP/23/2020) and Research Ethics Board of Health, Ministry of Health, Royal Government of Bhutan. Administrative clearance to collect data was granted by the Ministry of Health of both countries as well as from the Medical Superintendents/directors of the four hospitals. Informed consent was obtained from all the participants.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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