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Determining the Disability Status of Adult Patients Post General Intensive Care Unit Discharge using the World Health Organization Disability Assessment Schedule 2.0

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Abstract: *Background*: Critical care has evolved throughout the years since the polio outbreak when the first intensive care unit (ICU) was set up in the United States of America (USA). There is an increasing number of survivors of critical illness. The survivors have been shown to have prolonged physical, cognitive and psychological impairments. There is a paucity of current information on the status of these patients post ICU in Africa. *Objectives*: To measure the disability status of adult patients post general Intensive Care Unit (ICU) discharge using the World Health Organization Disability Assessment Schedule (WHODAS) 2.0. To determine the factors associated with the degree of disability. *Methodology*: This was a cross-sectional analytical study. Patients admitted to Aga Khan University Hospital, Nairobi, (AKUHN) ICU, were on mechanical ventilation for more than forty-eight hours and survived to hospital discharge were contacted by telephone. Once they were found to be alive and consented for the study, the WHODAS 2.0 questionnaire was used. The level of disability was measured using the WHODAS 2.0 which has 12 items, where each item was scored between 0 and 4; and the total score was displayed as a percentage. Factors associated with the degree of disability were retrieved from the patients' files. Data analysis was done using SPSS version 2.0. *Results*: 92 patients were enrolled into the study where 62.6% (n=57) were females. The disability status in our respondents was as follows; n=26 (28.6%) of them had no disability, n=26 (28.6%) mild disability and n=22 (24.2%) had moderate disability, n=17 (18.7%) of the patients reported severe disability while no participant had complete disability. Median age of 60 years and length of ICU stay were found to be associated with moderate to severe disability. Other factors like; duration of mechanical ventilation, number of comorbid, use of muscle relaxant/steroids, admission diagnosis was not found to be statistically significant in relation to degree of disability. *Conclusion*: In this study, 57.2% of patients had no disability to mild disability while 42.8% were found to have moderate to severe disability. Patients who were found to have moderate to severe disability had longer ICU stay and were in the older population.

Keywords: Disability, Critical Care Survivors, Post ICU Discharge, Physical Impairment, Mechanical Ventilation, Quality of Life

1. Introduction

Intensive care is a branch of medicine that deals with the critically ill with high morbidity and mortality rates [1]. The practice has slowly evolved since the polio outbreak when they used the positive pressure ventilation in 1952 in Copenhagen, Denmark, to when they set-up a four-bed shock ward, as the first intensive care unit, (ICU), in Los Angeles, California, USA [2]. The evolution has increasingly focused on improving the inpatient-care as well as reducing the mortality rates in the ICU. This has led to a marked increase in the number of survivors. ICU discharge is the beginning of a long path towards recovery, requiring efforts from the patients, their families and healthcare systems.

Post ICU has been shown to have a lot of stress, physically and psychologically, which end up having effects on the

quality-of-life patients may go back to. To create healthcare that is based on patient-centered outcomes for the survivors of critical illnesses, there has been a need to assess their post critical illness status in terms of, psychological wellbeing, physical abilities and emotional status [3]. The patient's physical status affects his/her family and the community in which he/she lives in. They may have survived critical illness but may find it difficult to reintegrate and be productive in the society, economically and socially. This may lead to depression and anxiety, with an impact on the socio-economic status of the family.

The ability to serve as functional members in the community is an important consequence for all patients, after any critical ailment and it is a sign of being at the end of their journey in the critical illness. A patient's possibility of returning to their daily activities impacts on the contentment with their life, careers, family, and overall health. Long term disablement of physical, mental and cognitive aspects affect most ICU survivors. [4] It is through this lens that we consider the use of the WHO Disability Assessment Schedule 2 (WHODAS) to assess disability status of ICU survivors and creating understanding between measuring of impairment and function and survival of critical illnesses.

WHODAS 2.0 was originally developed for psychiatric patients, although, it has undergone a lot of developments to the current one now which reflects on the complete international classification of Functioning (ICF) for Disability and Health and is able to measure the disability from both physical and mental chronic health status. WHODAS has been used to develop other measures for Quality of Life like WHOQOL, which measures subjective well-being like what the person 'feels' compared to WHODAS 2.0 which assesses the functionality of an individual, what a person can do [5]. WHO designed this questionnaire to assess limitations of activities regardless of a person's medical condition. There are three modes of administering WHODAS 2.0: self-administered, by interview or by proxy. The questionnaire has items that cover six parts of common daily living activities: understanding and communicating with the world; ambulation; self-care; interacting with people; daily living activities; and participation in society in general [6]. In each item, the responders estimate the degree of their disability during the previous 30 days, using a five-point Likert scale. The scores for each question range from 0 (no difficulty) to 4 (extreme difficulty/cannot do), providing a total range from 0 (no disability) to 48 (maximum disability) in the total score. The WHO-DAS 2.0 was evolved and tested across many cultures and found to be applicable both hospitals patients and in the community level [5].

In Africa, there was a study done in Ghana and Côte d'Ivoire assessing antepartum women with depression and anxiety and their impact on disability status using the WHODAS 2.0 12-item version, interviewer-administered with its translation. This study showed that we can use this version of the questionnaire and rely on it as a useful screening tool for disability in our set up with a translated version [7]. Another study done in South Africa and the USA, comparing disability status of people living with HIV in those countries, the WHODAS 12-item version, self-reported questionnaire was administered [8]. In our study, we used the telephone interviewer-administered version because our patients come from East and Central Africa, as referrals, hence it would be a difficult task and not cost-effective to call on people to come for interviews while the same information can be retrieved via a phone call. Patient's phone numbers are usually part of the information collected when a patient is admitted at our hospital. Hence, it was easy to retrieve this information from the record system.

The aim of our study was to assess the disability status of adult patients, post ICU discharge from the Aga Khan University Hospital. Our primary objective was to determine the disability status of adult patients, post ICU discharge in AKUHN using the WHODAS 2.0. Our secondary objective was to determine the factors correlated with the degree of disability including:

1. Age and gender.
2. Admission diagnosis.
3. Duration of mechanical ventilation.
4. Length of stay in ICU.
5. Acute Physiologic Assessment and Chronic Health Evaluation, (APACHE) II score.
6. Number of co-morbidities.
7. Steroid use.
8. Muscle relaxants use.

2. Materials and Methods

This was a retrospective, cross-sectional and analytical study. The study was conducted at The Aga Khan University Hospital, Nairobi through telephone interviews. The patients were recruited using the ICU database. Aga Khan University Hospital is a premier private tertiary healthcare facility and a teaching hospital located in Nairobi, Kenya. The ICU has 11 beds with most of the patients referred from in-hospital; from HDU or theaters according to the level of care they needed. However, there are some patients admitted as referrals from mainly East and Central African countries. It's completely an open ICU and several intensivists do daily rounds apart from the primary team.

Once the patients are discharged, they are taken to mainly HDU or the wards. Once the patient is discharged from the hospital, they are followed-up on a need basis at the primary team's discretion. The patient's records are kept safely in the hospital's records department where they can be retrieved, when necessary, with permission. The patient's contacts and next of kin are usually noted down as part of documentation during admission hence follow-ups and queries can be done whenever necessary.

Our study population was all adult patients admitted in ICU, between the period January 2017 and December 2018, had 48 hours of mechanical ventilation and survived to hospital discharge and alive at the time of assessment.

Our inclusion criteria into the study were:

1. Adult patients aged 18 and above who were admitted to ICU from 1st January 2017 to 31st December 2018.
2. Adult patients aged 18 and above who were admitted to ICU from 1st January 2017 to 31st December 2018.
3. Our exclusion criteria from the study were:
4. Patients who had hypoxic brain injury; diagnosis done by a critical care consultant and a neurologist/neurosurgeon.
5. Patient's refusal to participate.
6. Patients unable to speak Kiswahili or English.

Prior to recruitment of patients, the primary investigator trained themselves on how to administer the questionnaire using WHODAS 2.0 training manual. This training was validated by undertaking the self-test provided in the manual to ensure that they understood the material and how to administer the questionnaire correctly [5].

All patients who met the inclusion criteria were recruited and the interview administered once verbal consent was obtained from the patient. Eligible patients were obtained from the hospital records system, for patients who were admitted between the period of 1st January 2017 and 31st December 2018. Patients were recruited from the hospital record system. Once they meet the inclusion criteria, they were called via the phone. The call was made by the primary investigator, who followed the guidelines of WHODAS 2.0 document to teach themselves according to the instructions on interviewer administered questionnaire.

The English and Kiswahili version were administered, once approval to translate was granted by WHO. Their guidelines for translation were followed accordingly by a linguistic expert and the Kiswahili version of the script submitted to WHO; moreover, administration of the questionnaire was standardized since it was only the primary investigator conducting the interview. If the patient was alive, the questionnaire was administered once the verbal consent had been obtained via the phone from the patient. If the patient was not alive/not reached, the next patient on the list was called until all the patients who met the inclusion criteria were called. All patients were asked about their time of convenience before the phone interview was conducted. However, the privacy of the patient side, at the time of the phone interview could not be established since it was on a call interview, not on video interview.

All patients admitted during that period were assessed for eligibility from the hospital record system. A master list containing the names, hospital numbers and phone numbers was generated for each patient. Each recruited patient was then assigned a study identification number. This was then entered into the questionnaire. Patient identifiers were not entered into the questionnaire. The patients were then called on the phone by the primary investigator. According to the time of convenience, the interview was then done over the phone.

Demographic data and data representing factors associated degree of disability was extracted from the patient's medical records by the principal investigator and a research assistant once the verbal consent was obtained during the phone call. These data included name, age, sex, admission diagnosis, duration of ICU stay, number of comorbidities, medications used, use of muscle relaxants, use of any steroids and APACHE II scores. These data were then be put into a data collection tool.

The patient identifiable information was kept safely in an institutionally given laptop which is password protected in the custody of the principal investigator and assistant. A linking key to the patient's identifiable information in the original master list to the individuals' patient study was developed. The key and the master list were not stored in the same place to preserve confidentiality. Separate locks were used to store them. Hard copies of the filled-out questionnaires were stored in a separate cupboard, locked and was accessible to only the primary investigator and the assistant. The study data was entered electronically to create a database on a password-protected laptop to which only the investigator and the assistant will have access to.

On the completion of the study, the data was to be handed over to AKU Faculty of Health Sciences as per Section 4.1.6 (f) of the faculty manual of research policies and procedures. The data (both hard and soft copy) will be stored for a period of up to 10 years after which it will be destroyed according to institutional policy.

The WHODAS 2.0 short (12 item) version has a scoring system that assigns a value of between 1 to 5 for each item. However, we chose to assign each item a value of between 0 and 4 (total score of 48), because this has been validated in previous studies and will enable us to compare our results [9, 10]. The total was then displayed as a percentage. The level of disability was generated by categorizing the percentage score; categorized into no disability (0-5%), mild (6-24%), moderate (25-50%), and Severe (>50 %).

The association between the levels of disability and other factors was determined using the chi-square test and any variable with p-value< 0.05 or clinically significant was a plausible candidate for the multivariate analysis. Statistical analysis was done using SPSS version2.0.

3. Ethical Considerations

Our study proposal was submitted to the Aga Khan University Research Ethics Committee for approval. An over phone informed verbal consent was obtained and participation in the study was completely voluntary and anyone who wished to not participate was assured they would not be victimized. For those who started the interview and at any moment during the interview, refused to continue with it, were not coerced and appropriate support was given, whether it was due to emotional trauma or not.

4. Results

The total number of patients who were admitted to ICU between the period 2017 January- 2018 December was 837. Of this number, 241 of them died in the hospital, 151 patients died later out of hospital at least three months to one year post discharge, 347 were excluded from the study because they had not the inclusion criteria (less than 18 years of age,

admitted into ICU without mechanical ventilation during their stay, intubated and ventilated for less 48 hours, or could not be contacted), seven patients declined to participate even after meeting the inclusion criteria and only 91 patients could be enrolled into the study. The flow diagram of patients during the study is shown in Figure 1.

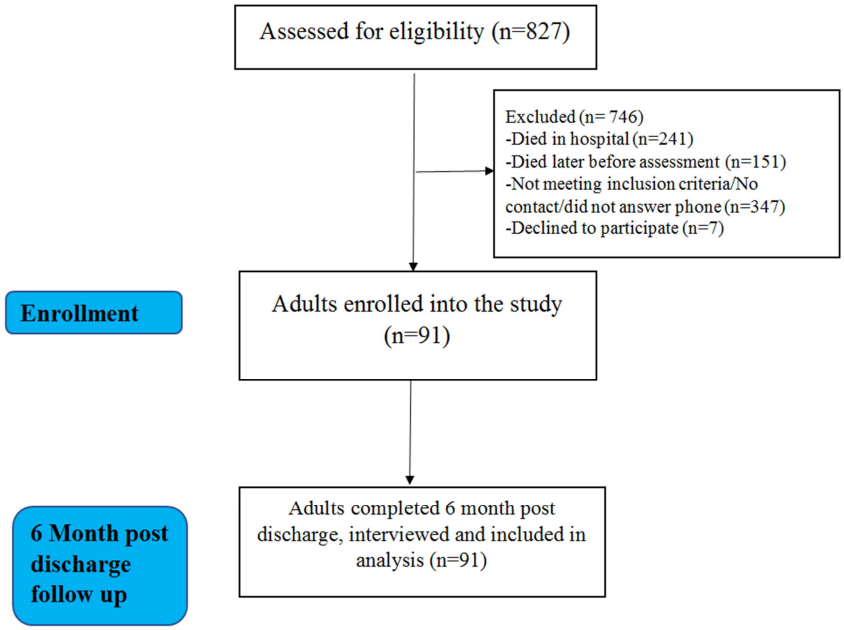

Figure 1. *STROBE Flow chart: STROBE, Strengthening the Reporting of Observational Studies in Epidemiology.*

Demographic characteristics of the patients were as follows; majority of the patients were above 50 years old n=44 (48.4%). Patients with ages of 31-50 were 35.2% (n=32) and those 18-30 years were 16.5% (n=15). Among the 92 patients who responded, n=57 (62.6%) of them were females. The average years of study was 15 years in school which was equivalent to a tertiary level of education.

Distribution of the patients by marital status was as follows; 20.9 % (n=19) of the respondents were never married and 62.6% (n=57) were still married at the time the study was conducted. Five patients (2.2%) were divorced, 8.8% (n=8) patients were widowed.

Majority of the patients were either self-employed 25.3% (n=23) or employed 25.3% (n=23). Eighteen (19.8%) of them were already retired while n=14 (15.4%) was unemployed. Due to the design of the questionnaire, the patients' employment status before the ICU admission was not recorded. These demographic characteristics are shown in Table 1.

Table 1. *Socio-demographic characteristics of the patients.*

Characteristics	Frequency (n-91)	Percent (%)
Age (years): Median (IQR, Range)	50 (35-65, 22-89)	
Age (years)		
18-30	15	16.5
31-50	32	35.2
>50	44	48.4
Years of study in school: Median (IQR, Range)	15 (12-16, 0-23)	
Gender		
Female	57	62.6
Male	34	37.4
Marital status		
Never married	19	20.9
Currently married	57	62.6
Separated	5	5.5
Divorced	2	2.2
Widowed	8	8.8
Work status		
Employed	23	25.3
Homemaker	4	4.4
Other	1	1.1
Retired	18	19.8
Self-employed	23	25.3
Stay at home	1	1.1
Student	4	4.4
Unemployed [Health Reasons; HR]	14	15.4
Unemployed [Other Reasons; OR]	1	1.1
Working	2	2.2

The disability status in our sample population was as follows; n=26 (28.6%) of them had no disability, n=26 (28.6%) mild disability and n=22 (24.2%) had moderate disability, n=17 (18.7%) of the patients reported severe disability while no participant had complete disability. Addition of each respondent's total score divided by 48 and converted to percent. Disability: 0-5% No disability, 6-24% Mild, 25-50% Moderate, >50% Severe. The disability status is shown in Table 2.

Table 2. *Disability status.*

Disability	Frequency	Percent
No disability (0-5%)	26	28.6
Mild (6-24%)	26	28.6
Moderate (25-50%)	22	24.2
Severe (>50%)	17	18.7

Although the patients were asked to report if the interview had psychological impact for referral, there were no patients who needed further psychological support. During the interview, patients mostly lamented on financial impact during the stay but were grateful on the overall management of their condition.

The median number of days in a month the patients had those difficulties present which was an average of 3 days while some had 2 days which they could not do their usual activities. This is shown in Table 3.

Table 3. *Number of Days disability was present, Median (IQR, Range).*

	Median (IQR, Range)
H1-In the last 30 days, overall, how many days were the difficulties present?	3 (0-21, 0-30)
H-2In the last 30 days, how many were you not totally able to carry out your usual activities or work because of your health?	2 (0-30, 0-30)
H3-In the last 30 days, not counting the days that you were totally unable, how many days did you have to cut back or reduce your usual activities or work because of any health condition?	2 (0-30, 0-30)

In the factors associated with disability status; the age of the patient, gender and admission diagnosis were available already but only 58 patients' full records were found in the system and were analyzed in the areas of comorbid, APACHE II scores, length of ICU stay, duration of mechanical ventilation, use of muscle relaxant and steroids. The median age for patients with disability was 60 years while the ones with no disability had a median age of 41. This was found to be statistically significant with a p value <0.001.

Disability according to gender distribution was as follows; n=24 of the females had disability, n=33 no disability while for the males n=15 had reported disability and n=19 had no disability. This is shown in table 4. According to the admission diagnosis, majority of the patients had neurological disease at 30.8% (n=28), followed by trauma/shock at 20.9% (n=19) and then which respiratory failure who had 18.7% (n=17). The others were found to be sepsis gastrointestinal disease and cardiogenic as illustrated in Table 4.

Table 4. *Factors associated with the degree of disability; age, gender and admission diagnosis (Yes: Moderate/Severe, No: None/Mild).*

Factor	Disability			OR (95% CI)	p-value
	Yes	No	Total		
Age: N=91, Median (IQR, Range)	60 (49-80, 22-89)	41 (31-53, 22-72)			<0.001
Gender: N=91, (%)					
Female	24 (26.4)	33 (36.3)	57 (62.6)	0.9 (0.4-2.2)	0.851
Male	15 (16.5)	19 (20.8)	34 (37.4)	Ref	
Admission diagnosis: N=91, (%)					
Neurological disease	10 (10.9)	18 (19.8)	28 (30.8)	Ref	
Cardiogenic	5 (5.5)	2 (2.2)	7 (7.7)	0.8 (0.04-14.6)	0.880
Gastrointestinal disease	2 (2.2)	1 (1.1)	3 (3.3)	0.2 (0.04-1.4)	0.104
Respiratory failure	7 (7.7)	10 (10.9)	17 (18.7)	0.3 (0.04-1.9)	0.190
Sepsis	6 (15.4)	3 (3.3)	9 (9.9)	0.8 (0.1-6.8)	0.839
Trauma/Shock	8 (8.8)	11 (12.1)	19 (20.9)	0.3 (0.05-1.9)	0.197
Others	1 (1.1)	7 (7.7)	8 (8.8)	0.1 (0.004-0.8)	0.035

Median and Pearson Chi-square test were used, n-number, IQR- interquartile ranges

The median duration of mechanical ventilation for patients with disability was 6.5 days while those with no disability had 4 days. This was however not statistically significant. On patients' length of ICU stay, the median was found to be at 9.5 days and the ones with no disability was 7.5 days. This was found to be statistically significant with a p-value of 0.035 as shown in Table 5.

Table 5. *Factors associated with degree of disability; Duration of Mechanical Ventilation and Length of ICU stay. (Disability: Moderate/Severe, No disability: None/Mild).*

	Disability	No disability	P-square
Duration of mechanical ventilation: Median (IQR, Range) N=58	6.5 (3.5-16.5, 2-45)	4 (3-5, 2-55)	0.067
Length of ICU stay: Median (IQR, Range) N=58	9.5 (5.5-22, 5-60)	7.5 (5-8, 3-70)	0.035

Median and Pearson Chi-square test was used**,** IQR-interquartile ranges

The APACHE score of patients with disability was at a median of 17 while the ones with no disability was at 15.5. In patients who were on steroids, the ones with disability were 39.3% (n=11) while those with no disability were 43.3 (n=13). The ones who were never on any steroids, n=17 had disability while the other n=17 had no disability. Only one patient was found to have disability and was on muscle relaxant, n=5 had no disability with a history of muscle relaxant use in ICU. Twenty-seven patients had a disability with no use of muscle relaxant and n=25 patients had no disability and no use of muscle relaxant as Table 6 shows.

Table 6. *Factors associated with degree of disability- APACHE II score and Comorbidity (Disability: Moderate/Severe, No disability: None/Mild).*

	Disability	No disability	Total	OR	p-value
APACHE II Score: Median (IQR, Range); N=58	17 (15-21, 10-32)	15.5 (13-20, 7-35)			0.432
Comorbidity; N=58, (%)					
Yes	19 (32.8)	16 (27.6)	35 (60.3)	1.8 (0.6-5.4)	0.259
No	9 (15.5)	14 (24.1)	23 (39.7)		

Median test and Pearson Chi-square test was used**.** IQR-interquartile ranges

The number of patients who had disability together with comorbid were n=19 while n=16 had no disability with history of comorbidity. The ones with no chronic illness and had disability were n=9 while 14 had no chronic illness and no disability. The odds of having a disability with a chronic illness was higher at 1.8 than not having any comorbid. However, this was not statistically significant as shown in Table 6.

The number of patients who had disability after use of steroids were n=11 while n=13 had no disability with history of steroid use. The ones with disability after use of muscle relaxant were n=1 while n=5 had no disability with history of use of muscle relaxant. However, this was not statistically significant as shown in Table 7.

Table 7. *Factors associated with Disability; steroid use and muscle relaxant; (Disability: Moderate/Severe, No disability: None/Mild).*

Steroid use: N=58:	Disability n (%)	No Disability n (%)	Total	OR	P-VALUE
Yes	11 (19)	13 (22.4)	24 (41.4)	0.8 (0.3-2.4)	0.754
No	17 (29.3)	17 (29.3)	34 (58.6)	Ref	
Muscle relaxant: N=58					
Yes	1 (1.7)	5 (8.6)	6 (10.3)	0.2 (0.02-1.7)	0.195
No	27 (46.6)	25 (43.1)	52 (89.7)	Ref	

Pearson Chi-square test was used.

5. Discussion

This was a retrospective study done on patients who were discharged from ICU, more than 6 months prior to the time of the study (2019 December-2020 March). It was carried out to determine the disability status post ICU discharge and factors associated with the degree of disability. We found 837 patients admitted in ICU, 46.8% of them died while in hospital or after discharge, this is a high mortality rate compared to the study done by Lukoko et al which showed mortality of 31.7% although her report was based on while the patients were in hospital [11]. However, this mortality rate was more comparable with the study done by Lalani et al which had a 30-day mortality rate of 57.3% [12]. Sixty-six patients were lost to follow up, which could have been a significant contribution to this study since the number is large; perhaps, we lost follow up because of their advanced disability which made it difficult for them to communicate. Seven patients in this study declined to contribute and their wishes were respected.

The majority of our patients were found to be above 50 years of age while the rest were between the ages of 31-50 years. Most of our patients were married at the time of the assessment, the next group were the ones who reported that they had never married, although, this did not capture the number of patients who were not married but had living-in partners. Only seven of them reported to have been separated, 2 were officially divorced and the rest were widowed. Unfortunately, we had not assessed on their pre-ICU admission marital status. However, our results, were similar to a study done in the United Kingdom (UK) by Griffiths et al. where they were assessing the socio-economic impact of ICU admission, 97% of their patients reported no change in relationship status between six to twelve months follow-up of patients who were discharged from ICU [13]. Marital status has not been shown to be a predictor for disability status in patients post ICU discharge. Although, it has been found to be a predictor of functionality outcome in patients post cardiac surgery survivors [14].

Fifty percent of our cohort of patients were either still employed, although at a different capacity, or self-employed while 15% were unemployed. The patients reported that their job capacity/level had changed after discharge from ICU compared to before. This is like the study done by Griffith et al although, he was comparing before and after ICU admission employment status. He reported that 33% of their respondents had negative impact on their employment after their ICU discharge. On an average of 2 days of the week, patients were found not to be able to carry out their usual activities due to the presence of their disability. This is bound to impact on their total output at work and in life generally although we did not assess the before and after work status of our cohort of patients.

The national Kenyan disability status is approximately 10% according to the Global Disability Rights Now data. The findings from the study showed 28.6% of the patients had no disability, 28.6% with mild disability, 24.2% had moderate disability and 18.7% with severe disability (more than 50% disabled). None of the patients were completely disabled (more than 95% disabled). This, certainly, adds to overall burden of disability in Kenya.

Comparing it with the study done by Hodgson et al, they found that 25% of patients reported no disability, 50% reported mild disability and 25% reported moderate to severe disability. In our study, our cohort had relatively higher,

moderate to severe disability, 42.9% compared to the study above which was 25% for both moderate and severe disability rates [9]. This was about 1.7 times more in our patients. This could be because some patients in that population were discharged to rehabilitation centers, unlike in our setup where the decision for rehabilitation was left to the primary physicians' discretion.

In our study, age was found to be a predictor of disability, however, in reviewing other studies, this was in tandem with a study done by Barnato et al which reported that ages above 65 years was associated with 30% greater disability in activities of daily living [15]. This showed that the elderly became more dependent on their caretakers/relatives after admission to critical care and subsequent mechanical ventilation. They unfortunately did not explore on the duration of mechanical ventilation.

Hodgson et al found that pre-admission history of anxiety and depression, separation or divorce or prolonged ventilation were factors affecting the degree of disability [9]. However, in our study, duration on the vent did not show significant association with the presence of disability. The length of ICU stay had shown to have some contribution on the presence of disability although the numbers were too small for further analysis. This may be due to the prolonged duration of immobility in critical care despite being extubated while in ICU as evidenced by the prolonged ICU stay. The patients who were found to have disability were more of the elderly and this could be explained by the presence of other comorbidities, which is an independent factor; patients with comorbidities were more likely to have disability after ICU admission compared with patients with no comorbidities. However according to the review done by Rawal G. et al, the conditions found to be strongly associated with ICU-acquired physical weakness were; prolonged mechanical ventilation, sepsis, multi-system organ failure and prolonged duration of the bed-restore deep sedation [16]. They did not comment on the length of ICU stay.

Other factors like severity of illness, steroid use or use of muscle relaxant which were not found to be associated with presence of disability or post ICU weakness compared to previous studies maybe due to high number of patient dropout due to death post ICU discharge, 158 and the seven patients who declined. According to Majer et al, people with disability in activities of daily living and ambulation, had a 10-year shorter lifespan than non-disabled people. This could be due to differences in lifestyle, socio-demographics, and major chronic diseases they had [17]. This could explain our high numbers of mortality post ICU discharge which could have been because of their post-ICU disability, together with the chronic illnesses.

This study had several limitations. Firstly, this was a cross-sectional which only captured the disability as a snapshot and does not report whether it was progressive in nature. It was not establishing whether the disability was a causality of the ICU admission or the primary disease progression since the study could not compare the before and after ICU disability status, due to recall bias. Also, there was no comparing of pre and post ICU marital status of the patients, as we know psychological support may have changed the progression of the disability. We also excluded patients with hypoxic brain injury which may have increased our disability rates due to the irreversible brain damage. Also, our study could not enroll large numbers because many patients had died by the time of the study or due to lack of proper ICU admission criteria in our setup since majority of patients did not meet the inclusion criteria. Also, the privacy on the patient's side during the interview could not be ascertained since it was via a phone call. Many patients were also lost to follow up, which could have contributed to our disability rates. It was also done among patients who had been admitted at AKUHN and this may be underestimating the burden of disability post ICU discharge in the country which could be higher since the patients in AKUHN hospital are from a different socio-demographic status.

6. Conclusions

There was a high mortality rate of 46.8% among our ICU patients. The disability status among patients who were discharged from AKUHN's ICU according to this study was 28.6% had no disability, 24.2% with mild disability and 42.8% with moderate to severe disabilities compared to a previous study done by Hodgson et al where their 25% of their patients had no disability and 50% mild disability and 25% were to have moderate to severe disability. In this study the factors found to be associated with presence of marked disability was increasing age.

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