



## QUALITY OF LIFE DURING ONE YEAR FOLLOW UP AFTER INTENSIVE CARE DISCHARGE

**Dr Praveen Pandey\***

Senior Resident, Department of Anesthesia, IMS, BHU, VARANASI. \*Corresponding Author

**Dr. L. D. Mishra**

Professor, Department of Anesthesia, IMS, BHU, VARANASI.

**ABSTRACT** Patient treated in an Intensive care unit (ICU) are seriously ill. Have a high co-morbidity, morbidity and mortality. ICUs are resource – demanding as they consume significant hospital resources for a minority of patients. The development of new medical procedures for critical care patients has over the years led to survival of large numbers with more complex illnesses and extensive injuries. Improved survival rates lead to needs for outcome measures other than survival. (1)Death and full recovery are two main and contrary outcomes of intensive care. As survivors often suffer from post intensive care unit (post- ICU) consequences, they cannot be regarded as fully recovered. Post-ICU consequences are caused by an illness itself, organ dysfunction developed before ICU admission or acquired during the stay in the ICU, and/or prolonged intensive care support of failed organ(s). Organ failure in intensive care may have an impact on the life of ICU survivors long after their discharge from the ICU. To evaluate the quality of health and life in such patients as a whole, mere objective clinical or laboratory analyses are not enough. Subjective perception of the physical and mental quality of life by patients themselves becomes more and more important for the evaluation of post-ICU outcomes.(2) As initial care advances and ICU mortality decreases number of survivors of critical illness is increasing. These survivors frequently experience longlasting complications of critical care. The purpose of this study is to understand these complications & implement evidence based practices to minimize them.

**KEYWORDS :** Intensive Care Unit, Quality Of Life

### INTRODUCTION

Patient treated in an Intensive care unit (ICU) are seriously ill. Have a high co-morbidity, morbidity and mortality. ICUs are resource – demanding as they consume significant hospital resources for a minority of patients. The development of new medical procedures for critical care patients has over the years led to survival of large numbers with more complex illnesses and extensive injuries. Improved survival rates lead to needs for outcome measures other than survival. (1)Death and full recovery are two main and contrary outcomes of intensive care. As survivors often suffer from post intensive care unit (post- ICU) consequences, they cannot be regarded as fully recovered.

Post-ICU consequences are caused by an illness itself, organ dysfunction developed before ICU admission or acquired during the stay in the ICU, and/or prolonged intensive care support of failed organ(s). Organ failure in intensive care may have an impact on the life of ICU survivors long after their discharge from the ICU. To evaluate the quality of health and life in such patients as a whole, mere objective clinical or laboratory analyses are not enough.

Subjective perception of the physical and mental quality of life by patients themselves becomes more and more important for the evaluation of post ICU outcomes.(2) As initial care advances and ICU mortality decreases number of survivors of critical illness is increasing. These survivors frequently experience longlasting complications of critical care. The purpose of this study is to understand these complications & implement evidence based practices to minimize them.

### AIMS & OBJECTIVE

- To quantify health related quality of life during 1 year of follow up after intensive care discharge.
- To estimate changes in physical, social, emotional and psychological status during one year after ICU discharge.

### MATERIAL AND METHODS

**Study Type:** Observational

**Study Design:** Retrospective observational cohort Study

**Study Setting:** Tertiary care Centre (ICU, Department of Anesthesiology, S.S Hospital, Varanasi)

**Sample Size:** 100 patients

After obtaining institutional ethics committee approval and written informed consent from patient or next of kin we conducted a single centre, prospective observational study on 100 patients who got

discharged after ICU of S.S. Hospital, B.H.U., Varanasi. This study was conducted between May 2016 to June 2017.

### Inclusion Criteria:

- Patients who receive more than 7 days of critical care and got discharged from Critical Care ICU.
- Patients who have given written informed consent.

### Exclusion Criteria:

- ICU stay  $\leq 7$  days
- Age  $< 18$  years and  $> 70$  years
- Patient refusal
- Those not responding after telephonic calls and postal communication
- Patient discharged for end of life care or after terminal illness
- Patient having history of any neurological or psychiatric illness.

### Follow up:

Patients were followed up 12 months after discharge. Detailed address with telephone number of all patients was recorded at the time of discharge. Follow up will be based on a questionnaire method to assess physical quality of life index (PQLI) after ICU discharge from critical illness. It will be based on SF 36

-Item health survey. SF-36 has been demonstrated to have acceptability, reliability and validity in the clinical patient including critically ill patients. The higher the score the better the quality of life. It is a comprehensive generic 36 items questionnaire based on eight parameters physical functioning, Bodily pain, role limitations due physical health problems, personal or emotional problems, emotional well, being, social functioning, energy/fatigue and health perception.

Comparison of Post ICU discharge quality of life was done with the status before the acute illness. At the time of stabilization after ICU admission, relatives, next of kin or family persons residing with the patient were asked to complete the SF-36 and specifically instructed to comment on the patients' quality of life before their current acute illness (4-week recall assessment) or done even by asking patient himself at the time discharge.

Detailed ICU data was recorded to study the influence of severity of illness on post ICU discharge status. It includes patient demographics, length of ICU stay and duration of mechanical ventilation. Few patients, who did not turn up to ICU follow up, were followed through telephonic communication.

### Statistical Analysis:

A statistical data analysis was carried out using the statistical analysis software SPSS Software version 20.0 Statistical Analysis of quantitative data (mean  $\pm$  SD) between different group done by using independent students 't' test. Data are presenter as means and standard errors of means or means and standard deviations from mean as appropriate, statistical Analysis of qualitative data (N %) between groups is done by using Chi-Square/ Fischer Exact test. The co-relation between various parameters has been done using Pearson co relation. In our study, results were considered statistically significant when the 'P value' was less than 0.05.

### OBSERVATION

The present study was conducted in the ICU Department of Anesthesiology of Sir Sundaralal Hospital, BHU, Varanasi from May 2016 to June 2017. Total 100 patients who met inclusion criteria were included in the study.

Mean age of patients was  $40.62 \pm 11.99$  years with male predominance (60%). The male : female ratio was 1.5:1. Community acquired pneumonia was the most common diagnosis present in 24 % cases followed by Acute febrile illness (20%), sepsis with septic shock (16%), acute liver failure and subacute pancreatitis (12%), myocarditis (8%).

The most common comorbidity was diabetes mellitus (DM) in (10%), followed by diabetes with hypertension (7%), and hypertension (3%). The mean ICU stay was  $13.64 \pm 3.75$  days and mean days of mechanical ventilation was  $7.93 \pm 3.89$  days.

### Patients Demographic & Disease Characteristics:

Characteristics	N (100)
Age (mean $\pm$ SD)	$40.62 \pm 11.99$
Sex	
Male	60 (60.0)
Female	40 (40.0)
ICU stay (mean $\pm$ SD)	$13.64 \pm 3.75$
<b>Diagnosis</b>	
Community Acquired pneumonia	24
Acute Febrile Illness	20
Sepsis with septic shock	16
Acute liver Failure	12
Subacute Pancreatitis	12
Myocarditis	08
Exacerbation of COPD	08
ICU Stay (mean $\pm$ SD)	$13.64 \pm 3.75$
Days of Mechanical Ventilation (DOMV)	$7.93 \pm 3.89$

\* In our study all the SF36 parameters (PF-Physical Functioning; RP-Role Physical; BP-Bodily Pain; GH-General Health; VT-Vitality; SF-Social functioning; RE-Role-emotional; MH-Mental Health; PCS-Physical Component Summary; MCS-Mental Component Summary.) were significantly reduced after 12 months postdischarge as compared to pre ICU admission.

\* After one year of follow up the correlation between age and SF36 parameters were negatively correlated with age which was statistically significant.

\* On correlating various SF36 parameters with days of ICU stay, all parameters were negatively correlated with days of ICU stay but not statistically significant except physical function.

\*On correlating SF 36 parameters with days of mechanical ventilation, statistically significant negative correlation was found between physical function and days of mechanical ventilation and other parameters were negatively correlate but statistically not significant.

\*On comparing various SF36 parameters with respect to gender females were having lower mental health score as compared to male. On comparing various SF36 parameters with number of days spent, no significant difference was found.

\*On comparing different SF 36 parameters with days of mechanical ventilation only general health was found to be significantly associated with days of mechanical ventilation.

### \*PHYSICAL HEALTH SCORE:

Physical Component Summary (P S) scale showed marked deterioration in percentage of population lying at or above general population norm at 12 month post discharge compared with pre-ICU state in all 4 components (Physical Functioning; Role Physical; Bodily Pain; General Health).

### \*MENTAL HEALTH SCORE:

Mental Component Summary (MCS) scale showed marked deterioration in percentage of population lying at or above general population norm at 12 months compared with Pre-ICU state.

### DISCUSSION

Recovery from critical illness is an international problem as evidenced by the wide range of literature and an issue is likely increase over the next decade. For some, recovery from critical illness is clearly prolonged, subject to both physical and psychological problem and that these may negatively impact upon HRQoL. Establishing the extent of magnitude of this problem is difficult and there are a number of methodological challenges. Measuring HRQoL is in essence evaluating the health status.

The survivors of critical illness are at risk of permanent physical and functional deficits that may affect psychological and social functioning, which is known to reduce HRQoL significantly, the ideal outcome is for the patient to return to their pre existing state or to that expected for a person of the same age and medical condition of individuals, both mental and physical, together with their own sense of well being. Orwelius et al observed that there is considerable decrease in all domains during the stay in the ICU and gradually improves thereafter. However, it is established that the quality of life remains poor even several months or years after intensive care as compared with that of the general population. Intensive care dependent factors (length of stay in the ICU, length of MV, and degree of organ dysfunction during the stay in the ICU) are indicated as influencing post-ICU quality of life.<sup>[1,2]</sup>

The most important aspects of HRQoL are physical and mental health, social function, role function and general well being, because the goal of health care is to maximize the health component of quality of life.<sup>[3,4]</sup>

Quality of life was assessed at multiple time points, including an evaluation of premorbid function (before illness to ICU admission as assessed by next of kin) and at 12 months after ICU discharge. Our study was conducted on 100 patients, fulfilling the inclusion criteria who got discharged from postop ICU of our hospital, SS HOSPITAL, BHU, VARANASI, using SF 36 Questionnaire .Those who did not come for follow up were communicated through telephone. Form health survey (SF-36) version 1 SF-36 is well known internationally and has been recommended for measuring HRQoL in critical care. It is reliable and validated for use in the ICU. Reliably benchmarking a patient's QOL during their recovery ideally involves comparisons with pre hospitalization baseline measures. Baseline QOL is also important because it can aid in prognostication and decision making in the ICU. We used a 4 week recall for assessment of quality of life at baseline, asking the next-of-kin specifically to comment on the 4-week period before this current illness.

The deterioration in patients' quality of life after ICU discharge found in most of the studies occurred due to the physical impact of critical illness. After a period of critical illness, patients often find themselves unable to accomplish even the simplest physical tasks without exhaustion.

On assessing Health related quality of life using SF-36 at pre-ICU status, and at 12 months after discharge, it was found significant deterioration in both physical and mental parameter from pre-ICU status to 12 months after discharge. Physical function, role-physical, bodily pain and general health make up the physical component score of SF-36 and vitality, social function, role-emotion and mental health make up the mental component score.. But still all components at 12 months postdischarge were lower than that of pre-ICU status. This result was similar to many previous studies done on ICU patients to assess quality of life postdischarge.

Ridley el al has also confirmed this in his study that intensive care impairs the quality of life nearly in all domains of the quality of life.<sup>[5]</sup> Steenburg et al found in his study that ICU survived had a

significantly lower HRQL compared to a control group and a large number of these patients (45%) did not return directly to their home situation after hospital discharge similar to result of our study.<sup>[6]</sup>

But Orwelius et al observed in his study that most significant decrease in the quality of life was observed in physical domains of the quality of life (PF and RP) and no differences were observed in other domains of the quality of life before ICU admission and 12 months after intensive care.<sup>[7]</sup>

On analyzing co-relation of different factors like age, gender, length of ICU stay and days of mechanical ventilation on different components of quality of life index, it was observed that age has significant effect on all component of SF 36 scores at time of discharge of ICU survivors, ( $<0.05$ ). But no significant co-relation was observed between length of ICU stay and gender. Number of days of mechanical ventilation during ICU stay has significant effect on Role Physical (RP), General Health (GH), Social Functioning (SF), Role Emotional (RE) and Mental Health (MH) only. Hence only Mental Component Summary (PCS) scale has significant deterioration due to mechanical ventilation but not Physical Component Summary scale (MCS).

But in contrast to our study findings, Cuthbertson et al showed that physical scores for quality of life were low compared to the general population norm before ICU admission by next-of-kin assessment. This decreased at 3 months and slowly increased back to baseline at 1 year but this was not the case with mental component scores.<sup>[7]</sup>

Factors such as age, and ICU length of stay were not associated with differences of quality after ICU admission.<sup>[8]</sup>

Wehler et al, Eddleston and Pettila et al, demonstrated that age is associated with poorer physical function and general health perceptions and vitality.<sup>[9-11]</sup>

Dowdy et al done systematic review of quality of life in 7320 adult ICU survivors. Regarding age, a majority of studies found significantly lower physical functioning (SF-36, Table 5), usual activities (EQ-5D), and physical or total QOL (SIP) in older versus younger ICU. Dowdy et al, reviewed six studies investigating severity of illness and QOL measured by SF-36, four (67%) of them concluded that, compared with the general population, ICU survivors have lower QOL for all domains (except bodily pain) at baseline and at 12 months after discharge and secondly, QOL in ICU survivors improves with over time after discharge, but this improvement is not uniform across domains.<sup>[12]</sup>

We also obtained the similar results. The distribution of ICU survivors in 2 age groups demonstrated that 66 patients were  $<50$  years and  $34 \geq 50$  years. Among 100 patients, 66 patients were below 50 years age group while the rest 34 were above 50 years of age. The comparison between these two groups of patients at 12 month postdischarge showed significant difference between two groups in all parameters except for bodily pain (BP).

Fildissis et al showed in his study that male sex had a positive association with quality of life. Male sex was found to be a risk factor for poor quality of life. Fildissis et al. showed a significant deterioration in quality of life at 12 months after ICU admission. The analysis suggested that age, length of ICU stay, and male sex were important risk factors influencing poor quality of life. Studies showed that physical functioning rapidly improved, whereas mental health usually showed none or slow improvement. Deterioration in quality of life increased with increased length of ICU stay and patients' age. This finding was consistent with our study.<sup>[13]</sup>

In our study, there were a total 40 females and 60 males. Contract to above study, with respect to gender, at 12 months post ICU discharge, significant difference in Mental Health (MH) parameter was observed between male and female ( $p$  value  $<0.05$ ). Females were having lower mental health score ( $40.08 \pm 8.17$ ) than males ( $43.85 \pm 6.18$ ) 12 months post discharge.

In previous studies, longer length of stay in the ICU (124) and prolonged mechanical ventilation (71) has been found to significantly affect the HRQoL after the ICU stay period.

Orwelius et al analyzed in the study that the quality of life in patients

with a length of stay in the ICU exceeding 7 days remained worse twelve months after ICU discharge as compared with the pre ICU quality of life.

A recent study examining HRQoL five years after major trauma found that the patients with a length of stay in hospital  $>5$  days reported lower SF-36 scores compared with those with shorter length of stay.<sup>[14]</sup>

On distributing study group population on basis of length of ICU stay, we found that 53 patients remained in ICU  $<14$  days while those who stayed for longer duration in ICU ( $\geq 14$  days) were 47. It was seen that bodily pain score was lower (worst) i.e. ( $49.71 \pm 7.55$ ) in those who spent longer duration in ICU ( $\geq 14$  days) compared to those who got discharged in  $<14$  days stay ( $53.53 \pm 7.76$ ). But at 12 months post discharge there was no significant difference ( $p$  value  $> 0.05$ ) in any of physical or mental health scores based on length of ICU stay.

But few previous studies looking at the effect of prolonged ICU length of stay suggested that prolonged stay does not affect quality of life after ICU.

Among all 100 post ICU survivors, 41 required mechanical ventilator support for  $<7$  days while 59 required mechanical ventilation for  $\geq 7$  days. At 12 months of ICU discharge, only bodily pain (BP) show statistically significant difference ( $<0.05$ ) between two groups of patients based on mechanical ventilation while rest the parameters showed no difference.

Griffiths et al demonstrated a marked deficit in all domain scores at 12 months and were consistent with previous reports. More patients reported some problems with mobility, compared with their pre-morbid state (54% at 12 months compared with 32% pre-admission). Of the patients, 13% required help with self-care before their acute illness; this had risen to 26% at 12 months.<sup>[15]</sup> Significantly more patients reported themselves to be experiencing moderate or extreme pain (70% at 12 months compared with 51% pre-admission), or to be moderately or extremely anxious or depressed than before their illness (44% at 12 months compared with 30% pre-admission). We also found similar result.

Physical Component Summary (PCS) scale which comprises 4 components namely, Physical Functioning (PF), Role Physical (RP), Bodily Pain (BP) and General Health (GH) showed marked deterioration in percentage of population lying at or above general population. At 12 months postdischarge remained lower than that of pre-ICU state.

### Limitations

Firstly, the main bias is the patient's memory because study was on recall basis. As ICU admission is generally an unplanned event, it was necessary to rely on patients' recall of their prior functional status. Secondly, sample size of our study was small. Further studies can be done by taking larger sample size and evaluation of quality of life at further intervals can be done.

Thirdly, this modest sample size study could not be restricted to a single disease population as patients with different primary diagnosis and co-morbidities were included in the study.

Fourthly, duration of study could be extending to assess further changes in quality of life with time.

Fifthly, baseline QOL was obtained retrospectively from survivors or from proxies. Reliability of relatives' assessment could be criticized due to altered relative perceptions. Sixthly, a small sample size does not allow generalization of outcomes to the entire ICU population. However the outcome may serve as an exemplar for the appropriate management of patients with these characteristics to improve HRQoL outcomes.

Lastly, in evaluating the HRQoL of a group of patients from ICUs, which group is to be used for comparison to assess the effects of ICU care properly. This is debatable. Several research workers have used the ICU patients themselves, and their next of kin. Although this approach is logistically appealing, it has been claimed to overestimate the HRQoL before admission to ICU, and lead to higher changes in estimates of HRQoL after discharge. It has also been shown that the next of kin underestimate the mental, and overestimate the physical, health of the patient before admission.

## SUMMARY AND CONCLUSION

The present study entitled "QUALITY OF LIFE DURING ONE YEAR FOLLOW UP AFTER INTENSIVE CARE DISCHARGE" was conducted in I.C.U. OF S.S HOSPITAL, B.H.U from MAY 2016 to JUNE 2017. In the present study 100 patients who got discharged from our hospital ICU, fulfilling inclusion criteria and have given written informed consent were included, SF 36 questionnaire was used for follow up assessment of quality of life in post discharge patients at 12 months. Results were calculated using SPSS 20.0 software.

We aimed to quantify health related quality of life and to estimate changes in physical, social, emotional and psychological status during twelve months after ICU discharge.

We found that Intensive care unit survivors have worse health related quality of life 12 months after discharge from the intensive care unit: They had lower Physical component summary scale (PCS) score well as mental component summary scale (MCS) score as compared with pre intensive care unit performance. Twelve months after ICU admission, quality of life status of most survivors showed an improvement from that of status at time of discharge from ICU but was still worse than on admission. Before ICU admission, 0% population under study was below general population norm on PCS scale and only 2% was on MCS scale. But 12 months below general population norm on MCS scale.

There is strong co-relation between age and quality of life during one year following intensive care discharge. Length of ICU stay doesn't have any effect on mental health scores and only affects Physical Functioning (PF). The number of days of mechanical ventilation required during ICU stay also affected both Physical and Mental health scores. Mental health deterioration was found to be more common in females post ICU discharge.

This study showed that quality of life in our patients was substantially reduced in respect to all health related parameters after ICU discharge as opposed to preadmission status and ICU stay affects ICU survivors physically, mentally, socially and emotionally as well. This follow- up time is too short for a reliable assessment of the recovery, since patients often need a longer time to recover from critical illness.

In conclusion, when evaluating the long-term outcome of ICU patients, the optimal timing of the assessment is essential because the health (especially the emotional domain) seems to improve slowly.

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