8. Economical Outcomes

8.1 Cost utility analysis

Cost Utility Analysis (CUA) is considered as variation of cost effectiveness analysis. CUA compares the cost of therapeutic alternatives which are adjusted for patient “utility” or preference. In this analysis, outcomes are reported in quality adjusted life years (QALY) (1).

8.1.1 Quality adjusted life years

Usage of QALY has the advantage as it measures the extent of health gain from an intervention and when combined with the costs which are associated with the intervention, it gives their relative worth from an economic view point. It has the advantage of comparing treatments for different disease states with the same outcome measure i.e., QALY.

Utility values can be obtained from patients, care givers, experts, or from public by standard gamble method, time trade – off method, or use of rating scales. These values represent the health status between 0 to 1, where 0 is considered as dead and 1 as best health state. There is a possibility of negative valuations which is considered as being worse than death.

In the present study, we obtained the utility values from EQ 5D 5L questionnaire which was represented in the table 9. We calculated the Quality Adjusted Life Years by the formula proposed by Luis Prieto and Jose A Sacristan(2), which is widely used.

\[
QALY = \left(\frac{\sqrt{1^2 + Utility^2}}{1.4142}\right) \times \text{Time}
\]
8.1.2 Incremental cost effectiveness ratio

Incremental Cost Effectiveness Ratio (ICER) represents the difference in costs divided by differences in outcomes observed between two programs. ICER was calculated by using the formula:

\[ \text{ICER} = \frac{\text{Cost A} - \text{Cost B}}{\text{Effectiveness A} - \text{Effectiveness B}} \]

Cost variables of the participants in both the groups were tabulated in table 6. Monthly income was Rs. 12,557 with standard deviation of Rs. 6,203 in the control group (CG) and Rs. 12,495 with std. deviation of Rs. 8,747 in the interventional group (IG) was observed. Hospital stay, 6.15 ± 1.56 days in control group and 6.03 ± 1.68 days in intervention group were observed. Cost per stent, inpatient drugs cost and operation cost were also tabulated.

Costs during the study period (2011-13) were analyzed in all the patients, in which healthcare perspective was used. All the direct costs which include cost of intervention, inpatient and outpatient visits, laboratory charges (fasting lipid profile and fasting blood sugars) and cost of medications were considered. However, indirect costs like transportation, food, sick leaves etc., were not included. The cost of the intervention was estimated based on the salary of the pharmacist was Rs. 20,000/- who works 8 hours per day and 6 days per week. The cost per work hour would be Rs. 100/-. The RP had spent around 51 minutes ± 08 minutes for intervention at discharge period and around 30 ± 12 minutes. Hence, total number of hours spent on each patient during the period was 3.5 hours per patient leading to the cost of Rs. 350/- per patient for the entire period. The total costs per patient were Rs. 12,652 ± 4213 and 13,487 ± 3945 for CG and IG respectively.

Using the above formula (2), we calculated the QALY; 0.7141 and 0.8714 for control and intervention groups respectively at 9 months and 0.7114 and 0.8582 were for control and
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intervention groups respectively at the end of study period (12 months). Incremental QALY **0.1468** was observed in favour of IG. This result was highly remarkable especially when the concept of PC is new to Indian context and it further strengthens our endeavour to provide PC to the patients.

In this present study, ICER was calculated as,

\[
\text{ICER} = \frac{13,487 - 12,652}{0.8582 - 0.7114} = \frac{835.03}{0.1468}
\]

ICER = Rs. 5, 688.21/QALY gained

In this study we found that, Pharmaceutical care intervention had an incremental cost effectiveness ratio of **Rs. 5,688.21 per QALY gained** when compared with standard care.

**8.2 Discussion**

In a study conducted at Spain, Cost effectiveness of pharmacist intervention in patients with depression was evaluated. From a societal perspective, the ICER for the IG compared with CG was € 9872 per QALY gained. When health care perspective was used, € 3,592 per QALY gained (3).

In a trial conducted at Sweden, where the costs and QALY was analyzed with the EQ 5D utility values. It shows no significant differences between the groups and IG patients gained 0.0051 QALY. These results into ICER of € 3, 16,243 per QALY gained (4).

RESPECT trial was conducted to evaluate the cost effectiveness of pharmaceutical care for older people. It was found that, pharmaceutical care was estimated as € 10,000 per QALY gained. The results emphasizes that, PC was cost effective in the sub group of patients aged >75 years than the younger study population (5).
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In a systematic review of pharmaceutical care program under Medicare drug benefit program, evaluated the cost effectiveness of the PC. Researchers were assumed that, 5 hours of PC given to each patient in the first year and 2.5 hours in the subsequent years. The review assesses the results as, 7.9 million number of life years saved with cost per life year saved $2100. PC at a cost of $2244 in the first year and $1122 in subsequent year would be cost effective. The review concluded that, PC would be cost effective across many practice settings (6).

In the patient population of end stage renal disease, PC had shown benefit in identifying and resolving the issues of medications, and the analysis suggests that $1 spent on the PC; health care system saves around $3.98 which is very significant (7).

PEER study was RCT with repeated measures over 18 months with the objective of economical, clinical and humanistic outcomes of pharmaceutical care plan given to elderly patients. The average cost per patient in IG was €1298.13 compared to €1419.88 in CG (8).

IMPROVE study with the similar objective was found that, overall healthcare costs were similar in both the groups and had no significant changes in HRQoL (9).

8.3 Conclusion

We conclude that, pharmaceutical care will gain the each quality adjusted life years at the additional cost of Rs. 5, 688/-. Considering the benefits over the additional cost for the services, it is highly cost effective service model. We hope this type of pharmaceutical care model will be implemented in India in larger scale, which will surely catches the attention of policy makers and different stake holders and make the provision of pharmaceutical care by pharmacist mandatory by law.
8.4 References


