ASSOCIATION OF DIALYSIS WITH QUALITY ADJUSTED LIFE YEARS (QALY) IN CONTOL GROUP PATIENTS

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KEYWORDS	ABSTRACT
Quality Adjusted Life Years, Quality of life, Cost Utility Index, Interventional group, Control group.	The research is carried out to determine the extent of QALY in renal impaired patients. In this research, the technique of quantitative analysis is employed on the kidney patents. The patients that are included in the research are entitled as control group, as no health related mediation was given to them. The study includes over 34 patients consist of females and males. The results of study revealed no remarkable betterment in quality of life of control group. The study also revealed the utility cost index that was nearly equals to 250,000/QALY. QALY is the most efficient and valuable mean for the allotment of source in "Health care system". This result is also in correspondence with outcome of previous research but the value of "QALY and cost effectiveness" is altered due to variation in number of years in contemporary and former researches.

INTRODUCTION

The term quality-adjusted life-year was firstly presented by Zeckhauser and Shepherd in 1976 in light if the sequential result of the crucial idea of "health status index" in early 1970s (Torrance, Thomas & Sackett, 1972; Fanshel & Bush, 1970). The jargon of QALY is deliberated as basal unit to examine the health events that are produced due to amalgam effect of quality of life and life span (Zeckhauser & Shepard, 1976). The QALY is defined as "measure of value of health outcomes. Since health is a function of length of life and quality of life, QALY was developed as an attempt to combine value of these attributes into a single index number" (Prieto & Sacristán, 2003; Gascon, Mas, Martínez, Dadvand, Rueda, Plasència & Nieuwenhuijsen, 2016). The estimation of QALY is very easy and is calculated by estimating helpfulness amount persuades by treatment in multiple interval of time with its impact to present number of QALYs attained (Prieto & Sacristán, 2003). The QALY is attained by medical expenses and is denominator of costs and represents as cost/QALY. This formula is utilized in comparison of cost-effective method for treatment (Papaioannou, Kennedy, Ioannidis, Sawka, Hopman & Pickard, 2009).

In last twenty years, QALY emerges as widely use variable in health sciences which can result in better yield (Prieto & Sacristán, 2013). There are three factors which enable the QALY as the important domain of research (Gascon et al., 2016). Firstly, the QALY is responsible to incorporate positive changes by increasing the quality) due to spending money on the treatment (Mylotte, Quenneville, Kotowycz, Xie, Brophy & Marelli, 2014). Secondly, the calculation process of QALY is very simple and easy and lastly, the QALY display as the main component of economic analysis in health care center. Almost 15-20% persons of age less than 40yrs have less rate of glomerular filtration. There is a high widespread of diabetes that ultimately leads to ESRD or uremia. In different systematic investigations, it is found that almost 150 people/year in Pakistan are suffering from this disease. Around 160000 patients annually are suffering from renal injury. One of leading management for renal impairment is DIALYSIS which is very costly treatment whose

expenses range from 150000 to 200000 rupees annually which is almost 0.6 gross on the health in contrast to 10 to 15 percent in the advanced countries.

The cost effectiveness investigation of uremic patients is first time calculated. Chronic renal failure shows various issues and problems at the position of NHS (National Health Services) because of high ratio of happening and high management and social costs for the management or maintenance of the disease. This form is very significant in terms of patient's QOL as well as cost impact, although cannot solve the issue but can delay the habitual demand of dialysis. Pakistan is an under developed country but people have a knowledge about this disease. Nephrologists are under established in Pakistan. There are only 80 nephrologists for "163 million people". In USA, there are "500 nephrologists for 300 million people". In a study conducted in 2008, it was revealed that 6000 patients were going through the dialysis procedures. 40% patients were treating with dialysis but rests are reluctant to receive the dialysis treatment due to the financial disability or other crisis. Most of the research revealed that 67% patients receive dialysis procedure twice a week. Therefore, the QOL condition/situation is worst in Pakistan.

LITERATURE REVIEW

The quality-adjusted life year is a general determination of disease and it includes the quantity and quality of life. This term describes economic assessment to judge the value for cash spending on medical treatments. This term was firstly introduced by Zeckhauser and Shephard in 1976 in the light if the sequential result of the basic concept of "health status index" in early 1970s (Torrance et al., 1972; Fanshel & Bush, 1970). The jargon of QALY is deliberated as the basal unit to examine the health events that are the produced due to amalgam effect of life span and quality of life. The former program involved two different types of tests that are as follow likewise, Tuberculin test and Phenyl ketonuria test. These tests were indicators of "health status index" (Bush, Chen & Patrick, 1973). The essential idea of QALY is stated that effect of multi-attributed utility theory structure in certain settings like utility independence among life period and health conditions, static comparative exchange and risk neutrality on the life period" (Pliskin, Shepard & Weinstein, 1980). Lately, perception related to utility theory of QALY and accompanying conditions were present and calculated in various tests (Gerard, 1992).

A detail research about usage of QALY as a "consistent unit for outcome measurement" was published in 1992 that utilize 51 economic evaluations (Gerard, 1992). Afterwards, QALY applications was advanced and it was then used for the determination of the cost-effectiveness and it was then employed as authorized reference for measurement of cost-effectiveness (Drummond, Sculpher, Brien & Stoddart, 2005; Mills, Brugha, Hanson & McPake, 2002). Discussion later on goes for its theoretical and practical use (Bleichrodt & Johannesson 1997). Currently, QALY is being employed in economic analysis and also serve as the base for the development of different types of health measures like disability adjusted life years in 1990. DALY is used to evaluate burden of disease. QALY and DALY are totally different approaches and they differ in many features. The feature of DALY is the age-weighting factor that is used to allot weight to life cycle of life lived at different ages. Disability factor in DALY core looks constant but it is not that simple in the view of various researchers (Murray, 1994; Rushby & Hanson 2001). QALY is more elaborated and clear and describes static adjustments. The complete statistical equation of QALY for specific population is called "health status unit year" (Torrance, 1976).

MATERIALS AND METHODS

Type of Research

The study was conducted in two nephrology wards in Sheikh Zaid Hospital, Lahore. Male and female patients were included in this research. The research was orchestrated on

patients from the period of June, 2016 to May, 2017. 34 patients suffering from kidney diseases were chosen and evaluated with the intervention of the on-duty physicians.

Demographical Details of Patients
The statistical detail of the demography of control group is enlisted below:

Table 1 Frequencies Regarding Gender

S No.	Gender	Patients	Percentage
1	Female	14	41%
2	Male	20	59%

Table 2 Frequencies Regarding Age Group

S No.	Interval	No. of individuals	Percentage
1	21-30	07	20.6%
2	31-40	02	5.9%
3	41-50	09	26.5%
4	51-60	10	29.4%
5	Above 60	06	17.6%

Table 3 Frequencies Regarding Marital Status

S No	Status	No. of individuals	Percentage
1	Unmarried	03	9 %
2	Married	31	91%

Table 4 Frequencies Regarding Qualification

S No.	Qualification	No. of individuals	Percentage
1	Uneducated	12	35.2%
2	Primary pass	05	14.7%
3	Middle pass	02	5.9%
4	Matriculation	05	14.75%
5	Others	10	29.4%

Table 5 Frequencies Regarding Family Type Division

S No.	Family type	No. of individuals	Percentage
1	Joint	25	73.5%
2	Nuclear	09	26.5%

Table 6 Frequencies Regarding Bisection

S No	Area	No. of individuals	Percentage
1	Urban	31	91.2%
2	Rural	03	8.8%

Table 7 Frequencies Regarding Occupation

S No	Designation	No. of members	Percentage
1	Skilled	11	32.4%
2	Unskilled	03	8.8%
3	Professional	09	26.5%
4	House workers	11	32.4%

DATA CALCULATIONS

Aspects of Living
The elements of life of the examinee were analyzed by means of eight indices that are as follows:

Table 8 Elements of Life

S. No	Elements	S. No	Elements
1	Bodily Pain Scale	5	Social Functioning Scale
2	Role Physical Scale	6	Vitality Scale
3	General Health Scale	7	Mental Health Scale
4	Physical Functioning Scale	8	Role Emotional Scale

The values for each parameter of aspects of the living are enlisted as follows which are analyzed through different dimensions:

Role Physical Scale
This parameter is calculated at 3 different levels (initial level, 12 weeks, 9 months) and has three mean values that are:

Table 9 Role Physical Scale

S No	Level	Scale value
1	Initial level	22.721
2	After 12 months	43.745
3	After 9 months	42.222

Bodily Pain Scale
This scale is also measured at three different levels (initial level, 12 weeks, 9 months) and have following mean values:

Table 10 Role Physical Scale

S No	Status	Scale value
1	Initial level	42.941
2	After 12 weeks	47.419
3	After 9 months	48.556

Table 11 Physical Function Scale

S No	Status	Scale value
1	Initial level	38.294
2	After 12 weeks	48
3	After 9 months	52

Table 12 General Health Scale

S No	Status	Scale value
1	Initial level	58.373
2	After 12 weeks	59.462
3	After 9 months	61.79

Table 13 Vitality Scale

S No	Status	Scale value
1	Initial level	52.324
2	After 12 weeks	54.677
3	After 9 months	59.519

Table 14 Social Functioning Scale

S No	Status	Scale value
1	Initial level	52.324
2	After 12 weeks	54.677
3	After 9 months	59.519

Table 15 Role Emotional Scale

S No	Status	Scale value
1	Initial level	43.529
2	After 12 weeks	45.688
3	After 9 months	58.593

Table 16 Mental Health Scale

S No	Status	Scale value
1	Initial level	41.824
2	After 2 weeks	54.645
3	After 9 months	58.111

Mean Values of Entire Proposed Subscales

The average value of the aspects of life can be calculated by taking average of the values of aspects of life i.e. at initial level, after 12 weeks and after 9 months. The average values of these parameters are:

Table 17 Entire Proposed Subscales

S No	Status	Average value
1	"Initial level"	44.640
2	"After 12 weeks"	51.071
3	After 9 months	53.805

Table 18 Total Average Score

Scales	Group	Mean	P-Values
Role Physical Scale	Day-1	22.7	0.0000
	12 –Weeks	43.1	0.0000
	9-Month	42.2	0.0000
Bodily Pain Scale	Day-1	42.9	0.0000
	12 –Weeks	47.4	0.0000
	9-Month	48.6	0.0000
Physical Functioning Scale	Day-1	38.3	0.0000
	12 –Weeks	48	0.0000
	9-Month	52	0.0000
General Health Scale	Day-1	58.4	0.0000
	12 –Weeks	59.5	0.0000
	9-Month	61.8	0.0000
Vitality Scale	Day-1	57.2	0.0000
	12 –Weeks	55.6	0.0000
	9-Month	55.7	0.0000
Social Functioning Scale	Day-1	52.4	0.0000
	12 –Weeks	54.7	0.0000
	9-Month	59.6	0.0000
Role Emotional Scale	Day-1	43.6	0.0000

	12 –Weeks	45.7	0.0000
	9-Month	58.6	0.0000
Mental Health Scale	Day-1	41.9	0.0000
	12 –Weeks	54.7	0.0000
	9-Month	58.1	0.0000
Mean values of All subscales	Day-1	44.7	0.0000
	12 –Weeks	51.1	0.0000
	9-Month	54.6	0.0000
	Total Average	50.1	0.0000

RESULT OF STUDY

The QALY is determined by the following formula:

$$QALY = t*Q \dots\dots\dots\dots\dots\dots\dots \text{(Quality Adjusted Life Year)}$$

Where,

"Q= utility value of Health State."

"t = time period spent in given condition."

When value of Q is changed the QALY is re-established and value can be found by simple summing up. But, "when the value of Q is altered for a longer period of time for instance if t =1 year then" (Kind, Lafata, Matuszewski & Raisch, 2009; Donaldson, Baker, Mason, Lee, Lancsar, Wildman & Sugden, 2011).

$$QALY = t*Q_1 + t*Q_2 + t*Q_3 \dots\dots\dots\dots\dots$$

"(Sum of Quality Adjusted Life Years)"

Table 19 Calculation of QALY

Targeted Group	No. of Patients	Avg. Cost (Pk R)	Lived Life Year	Utility value of Health State	QALY
Control Group	"34"	"150000"	"0.1"	"0.45"	"0.58"
			"0.25"	"0.5"	
			"0.75"	"0.55"	

Value of QALY for control group is found to be 0.58.

Cost–utility ratio = $\dfrac{\text{Cost of Control Group}}{\text{QALYs produced by Control}}$

Cost utility value of control group is approximately 250000 RS of one year.

DISCUSSION

QALY is used to illustrate computation techniques for calculating quality adjusted life expectancy and also measures the outputs of health interventions. It is also employed for comparison 2 or additional interventions. 'Cost utility' calculation can be used through QALY by simply computing costs / gained QALY. It is unveiled from the Pakistani data that society-orientated researches about chronic kidney illness are measured as macabre condition in Pakistan. Almost 15-20% persons of age less than 40 years have less rate of glomerular filtration. There is a high widespread of diabetes that ultimately leads to end stage of the renal disease (ESRD) or uremia. In different systematic investigations, it is found that almost annualy150 people in Pakistan are suffering from this harmful disease. Annually around 160000 patients have the renal impairment. One of the leading issues about renal impairment is DIALYSIS which is very costly cure cost amount Rs. 150000-200000 annually.

This is almost 0.6 gross on health in comparison to 10-15% in advance nations. From the best of researcher knowledge, this research is initial effort to calculate cost effectiveness investigation of the uremic patients. CRF (chronic renal failure) results in number of the troubles at position of NHS (National Health Services) due increase ratio of happening and high costs for the organize of this harmful disease. This is more significant in terms of patient's QOL as well as cost impact, although cannot solve the issue but it may result in delay in habitual desire of dialysis. In this study, no remarkable recoveries in health status of individuals were observed from first day of the intervention to ninth month in all areas of GH, PF and MH. Increase in QALY from 7% at baseline to 3 months after the discharge was observed in control group. And increase from eleven percent at baseline to 9 months after first reciprocation was being observed in control group. Also, mortality or death rate is high i.e. 16%.

CONCLUSION

QALY is the most efficient and valuable mean for the allotment of source in "Health care system". This research is conducted to standardize value of "quality adjusted life years and quality of life" in patients with interventions and control group of dialyses' patients. In this study, it is concluded that the QOL of members of control group remain same and no remarkable betterment was observed in these patients. Value of QALY is calculated almost 250,000 rupees. When analysis of the control group and the group that has been provided with intervention was compared, a noteworthy discrepancy can be seen in QOL of kidney patients. This result is analogous to previous researchers but cost effectiveness rate of QALY was not same because of variation in number of years. This result ensures that "quality adjusted life" of the control group show no prodigious revitalization among kidney patients at "Sheikh Zayed hospital, Lahore". This result is in correspondence with outcome of previous research but value of "QALY and cost effectiveness" is altered due to variation in number of years in contemporary and former researches.

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