

# Model in Estimating Economic Loss in Personal Injury and Death Litigation

Haslifah Hashim

**Abstract**—In the United States, the human life value method is often used in court cases involving personal injury and death litigation, attempts to measure the compensatory economic damages. However, there are some weaknesses of using human life value in the calculation. Currently in Malaysia, courts use the traditional multiplicand-multiplier approach when assessing the economic losses and damages. The objective is to calculate a lump sum amount to compensate the plaintiff for future loss of earnings and to cover expenses. I believe this is where actuarial scientists need to play a role in developing a new scientific model in order to acquire an appropriate amount of court award, which is relevant and satisfy both plaintiff and defendant. Therefore, the objective of this research is to develop a scientific model using the human live value method with few revisions that can be used as a guide to determine the amount of court award in personal injury and death litigation. References will be made to the appropriate acts and court cases, where applicable, throughout this paper. Using the actuarial model, the research findings indicate that victims are being under compensated. The economic damages that are awarded are insufficient to cover their losses of future earnings. Legal reform is necessary to address this issue.

**Keywords**—Death litigation, human life value, loss of dependency, loss of earnings, personal injury.

## I. INTRODUCTION

COURT awards for compensatory damages are intended to give victims a sum of money in the form of damages which will restore the individual, in financial terms, as nearly as possible to the position they would have been in if the wrong had not been committed. The compensation comprises an award for economic losses which often referred to as monetary losses, include medical expenses, wage loss, and other out-of-pocket expenses; and non-economic losses associated with pain and suffering.

In the United Kingdom, the use of actuaries or forensic economists in calculating economic damages in personal injury and death litigation is rare. In the past, judges have used their own ‘common law’ and ‘common sense’ standards for calculating damages [1]. These standards usually consisted of multipliers that could be applied to a plaintiff’s income or medical costs to estimate their economic loss. These

multipliers were derived from past court decisions and had little scientific basis.

In an attempt to bring some sound actuarial principles to the use of multipliers, the Government Actuary’s Department, United Kingdom (GAD) produced a set of multipliers in year 1984 named “Actuarial Tables with Explanatory Notes for Use in Personal Injury and Fatal Accident Cases”, also known as the “Ogden Table” named after the first chairman of a multi-disciplinary working party that developed the actuarial tables, Sir Michael Ogden.

Judges in the United Kingdom were not required to use the Ogden Tables in calculating damages until year 1999, where in the case of *Wells v Wells* [1999] AC 345, the House of Lords approved actuarial technique as the primary method of calculating future economic losses and made it compulsory to utilise the Ogden Tables when assessing a settlement. The tables take into account life expectancy and provide a range of discount rates. The most recent edition of the tables also sets out a method for taking into account contingencies other than mortality, including the assessment of a claimant’s residual earning capacity after an accident.

Currently in Malaysia, courts use the traditional multiplicand-multiplier approach when assessing the economic losses and damages as specified by the Civil Law Act 1956 (CLA). However, there is still a marked reluctance on the part of Malaysian courts to accept actuarial assessment dealing with personal injury and death litigation cases, for instance in the case of *P.S. Lum v H.H. Lim* [2001] 4 AMR 4171. The question often asks, are these laws and their interpretations and applications fair to the dependants whose breadwinner has been killed or the accident victim who has been seriously injured?

To be fair in estimating economic loss for all personal injury and death litigation cases handle by jurisdiction and to satisfy both plaintiff and defendant party according to the award calculation, the objective of this research is to develop a standard actuarial model that can be used as a guide to determine the amount of court award.

The current methods that have been developed by forensic economists generally take a conservative and perhaps overly narrow approach to valuing life and household production especially in areas of wrongful injury and death. Researcher suggested that an accurate estimation should consider factor as family profile [2]. Therefore, in this research I used a family lifetime modelling in order to develop an

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H. Haslifah is now with Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia. (e-mail: haslifah@tmsk.uitm.edu.my).

actuarial model in estimating economic loss in personal injury and death litigation.

Despite the sometimes scathing remarks made by the judiciary on the role of actuaries in valuing personal injury and death claims, I believe that the courts have in effect attempted to use actuarial practice in making their own assessment of damages. Actuaries do not claim to predict the future but they do aim to place current values on future uncertain events, especially those with a financial outcome, in a sound and scientific manner [3].

References will be made to the appropriate acts, case law, court cases, where applicable, throughout this paper.

## II. THE MODEL

### A. General Model

I developed a general model of the court award as follows:

$$CA = L [P_1(SD) + P_2(GD)](1+i)^T \quad (1)$$

where,

- CA = Court award
- L = Percentage of assessing liability
- P<sub>1</sub> = Probability of personal injury assessment for special damages
- P<sub>2</sub> = Probability of personal injury assessment for general damages
- SD = Special damages (pre-trial economic losses)
- GD = General damages (non-economic losses added to post trial economic losses)
- i = Interest rate
- T = Years of court trial

### B. Estimating Special Damages (SD)

This research used a revision method of human life value that has been developed using a family lifetime modelling [4].

To begin the family lifetime model formulation, I estimated the person's total income for each year from projection of his current salary over the remaining years of his working lifetime and income after retirement such as retirement benefits. I used a constant future salary increment rate at 6% per annum in the computation. Let,

- x = Current age
- I<sub>x+t</sub> = Total income for at age x+t
- e<sub>x</sub><sup>ow</sup> = Working life expectancy
- S<sub>x+t</sub> = Current salary per month
- s = Constant future salary increment rate per annum
- EPF = The statutory minimum Employee Provident Fund (EPF) contribution rate (employee)
- (EPF Savings)<sub>x+e<sub>x</sub><sup>ow</sup></sub> = EPF savings on retirement
- V<sup>t</sup> = Present value at time t

The total income for the person at age x+t is,

$$I_{x+t} = 12S_{x+t} (1+s)^t (1-EPF)$$

Therefore, the present value of the income is as follows,

$$\begin{aligned} PV(I) &= I_{x+0} V^0 + I_{x+1} V^1 + I_{x+2} V^2 + \dots + I_{x+e_x^{ow}-1} V^{e_x^{ow}-1} \\ &\quad + (EPF \text{ Savings})_{x+e_x^{ow}} V^{e_x^{ow}} \\ &= \sum_x^{x+e_x^{ow}} I_{x+t} V^t \quad t = 0, 1, 2, 3 \dots t < e_x^{ow} \end{aligned} \quad (2)$$

The projection of EPF savings is the accumulation of future contributions and therefore it involves time value of money. The summing of these accumulated future contributions involves the summing of a geometric series. The contribution rate for the employer and employee are assumed at 12% and 11% respectively<sup>1</sup>, thus k = 23%. The dividend rate is assumed at 5% per annum. Let,

- X = Salary per month at entry into EPF membership
- k = Total statutory minimum EPF contribution rate
- s = Constant future salary increment rate per annum
- d = Constant future EPF dividend rate
- n = Number of completed years in service

The projected EPF savings at the end of n years,

$$= 12Xk(1+d)^{n-1} * \frac{1 - \left(\frac{1+s}{1+d}\right)^n}{1 - \left(\frac{1+s}{1+d}\right)}, \text{ if } s < d$$

$$= 12Xk(1+d)^{n-1} * \frac{\left(\frac{1+s}{1+d}\right)^n - 1}{\left(\frac{1+s}{1+d}\right) - 1}, \text{ if } s > d$$

$$= 12Xk(1+d)^{n-1}, \text{ if } s = d$$

Next, income tax for the person is calculated for each year until retirement age using the existing tax tables and rules produced by the Inland Revenue Department in Malaysia. Let,

- x = Current age
- T<sub>x+t</sub> = Total tax payable at age x+t
- e<sub>x</sub><sup>ow</sup> = Working life expectancy
- V<sup>t</sup> = Present value at time t

The present value of the total income tax payable is,

$$\begin{aligned} PV(T) &= T_{x+0} V^0 + T_{x+1} V^1 + T_{x+2} V^2 + \dots + T_{x+e_x^{ow}} V^{x+e_x^{ow}} \\ &= \sum_x^{x+e_x^{ow}} T_{x+t} V^t \quad t = 0, 1, 2, 3 \dots t < e_x^{ow} \end{aligned} \quad (3)$$

Then, I estimated the total amount of household expenditures, which are calculated using the data published by the Department of Statistics, Malaysia. Let,

- x = Current age

<sup>1</sup> Since the EPF contribution rates for the employer were maintained at 12% since December 1980, therefore I assumed the rate is 12% in this analysis. For the employee, the contribution rates were between 9% to 11% since December 1980, with the current rate at 11%.

$HE_{x+t}$  = Total household expenditure costs at age  $x+t$   
 $e_x^o$  = Life expectancy  
 $V^t$  = Present value at time  $t$

The present value of the total household expenditures is

$$PV(HE) = HE_{x+0}V^0 + HE_{x+1}V^1 + HE_{x+2}V^2 + \dots + E_{x+e_x^o}V^{x+e_x^o}$$

$$= \sum_x^{x+e_x^o} E_{x+t} V^t \quad t = 0, 1, 2, 3 \dots t < e_x^o \quad (4)$$

Children’s education costs are also included in the computations. In addition, other post death needs such as funeral expenses are also incorporated. Let,

$x$  = Current age  
 $OE$  = Total of other expenses  
 $b_i$  = Median age at birth for the  $i$  child according to age of  $x$ , where  $i = 0, 1, 2, \dots, N$   
 $e_x^o$  = Life expectancy  
 $V^t$  = Present value at time  $t$

Therefore, the present value of other expenses is as follows,

$$PV(OE) = (\text{Education cost for the first child})_{x+b_1} V^{b_1-x}$$

$$+ (\text{Education cost for the second child})_{x+b_2} V^{b_2-x} + \dots$$

$$+ (\text{Education cost for the } n^{\text{th}} \text{ child})_{x+b_n} V^{b_n-x}$$

$$+ (\text{Funeral expenses for the husband})_{x+e_x^o} V^{e_x^o} \quad (5)$$

Then, the present value of net future income (special damages) flow for the person can be calculated by sum up (2), (3), (4) and (5).

I used the same model to estimate the loss of dependency<sup>2</sup> or loss of future earnings. The income and personal tax of the breadwinner are assumed to be nil. Household expenditures and other expenses like education costs and funeral expenses are calculated for each year until the dependents’ expected age of death, or until the children leave tertiary education at the age of 21.

### III. CASE STUDIES

#### A. Mohamed Mat Amin & ORS v Mohd Rabu Ihsan [2002] 5 CLJ

According to the court case of Mohamed Mat Amin & ORS v Mohd Rabu Ihsan (18 July 2001), on 18 December 1992, Mohd Nor Mohamed (the first deceased) was riding motorcycle and Noor Hasisan Mohd Nor (the second deceased) was riding another motorcycle, an accident occurred in which both of them died. The plaintiffs wanted to claim their loss of dependency and special damage arising out of the road accident. In the circumstances, the judge found that the defendant wholly to be blamed for the accident. In respect of the first deceased person, the following damages are paid by

<sup>2</sup> Loss of dependency claims brought by spouse, children and parents of the deceased often arise due to the death of victims in accidents under Section 7(1), (2) & (3) of CLA

the defendant – under special damage, the parties agreed to the sum of RM2,000 for funeral expenses and the sum of RM450 for the cost of repair to the motorcycle.

For the loss of dependency, the first, second and third plaintiffs are the father, mother and the son of the deceased person. The claim for loss of dependency is made under the CLA. The deceased was 35 years old at the time of his death. Based on section 7(3)(iv)(d) of the Act, the multiplier works out as follows:  $55 - 35 = 20/2 = 10 * 12 \text{ months} = 120 \text{ months}$ .

In all the circumstances of the case, taking into account the number of family member relying on the deceased person, the judge decided a sum of RM600 per month to be given to the plaintiffs. Therefore, the total award for the loss of dependency in respect of the first, second and third plaintiffs was  $120 * RM600 = RM72,000$ .

However, there are weaknesses of using the multiplier method. Clearly, this method is very simple and misses a range of important factors such as household demographics, expenditures and social security offsets. It also ignores expected life changes and individual preferences about sustaining the living standard of survivors.

I used the human life value revision method described above to estimate the amount for loss of dependency. Firstly, I developed a family lifetime model for this case study and estimate the present value of the net future income of the deceased as shown in Table I. If the breadwinner is still alive, the monetary value of himself would be RM109,044.

TABLE I  
CASE STUDY 1: PRESENT VALUE OF NET FUTURE INCOME OF THE DECEASED

Age of Deceased	Age of Plaintiffs			Income (I)	Income Tax (T)	Household Expenditures (ME)	Other Expenses (OE)	Surplus	Present Value
	Father	Mother	Son						
35	64	66	11	16,800	65	11,253		5,481	5,481
36	65	67	12	17,808	95	11,590		6,122	5,943
37	66	68	13	18,876	127	11,938		6,810	6,419
38	67	69	14	20,009	161	12,296		7,551	6,910
39	68	70	15	21,209	197	12,665		8,346	7,416
40	69	71	16	22,482	235	13,045		9,201	7,937
41	70	72	17	23,831	275	13,436		10,118	8,473
42	71	73	18	25,260	318	17,299	37,506 <sup>4</sup>	-29,864	-24,282
43	72	74	19	26,776	292	17,818		8,665	8,840
44	73	75	20	28,383	340	18,353		9,689	7,426
45	74	76	21 <sup>5</sup>	30,086	391	18,904		10,790	8,029
46	75	77		31,891	541	19,471		11,974	8,581
47	76	78		33,804	881	15,455		17,692	12,251
48	77	79		35,833	1,023	15,919		19,114	12,863
49	78	80 <sup>2</sup>		37,983	1,173	15,989	7,562 <sup>3</sup>	13,481	8,764
50	79 <sup>1</sup>			40,262	1,333		7,789	31,362	19,986
									109,044

- Note:**
1. The expected age of death for a male aged 64 is 79.
  2. The expected age of death for a female aged 66 is 80.
  3. Dependants include children up to 21 years old.
  4. Children education cost.
  5. Funeral expenses

The death of the breadwinner usually terminates an income stream that the family has relied upon. The costs of daily living for survivors and post death expenses are needed to leave the family in their current standard of living. Thus, I estimated the household expenditures for the surviving families. There are also other needs that arise following the death of the breadwinner, for instance household debts and funeral expenses. Using the human life value revision method, the expected amount for loss of dependency is RM221,850 as shown in Table II.

TABLE II  
CASE STUDY 1: THE EXPECTED AMOUNT FOR LOSS OF DEPENDENCY

Age of Deceased	Age of Plaintiffs			Income (I)	Income Tax (T)	Household Expenditures (ME)	Other Expenses (OE)	Surplus	Present Value
	Father	Mother	Son						
35	64	66	11	0.00	0.00	11,253		-11,253	-11,253
36	65	67	12	0.00	0.00	11,590		-11,590	-11,253
37	66	68	13	0.00	0.00	11,938		-11,938	-11,253
38	67	69	14	0.00	0.00	12,296		-12,296	-11,253
39	68	70	15	0.00	0.00	12,665		-12,665	-11,253
40	69	71	16	0.00	0.00	13,045		-13,045	-11,253
41	70	72	17	0.00	0.00	13,436		-13,436	-11,253
42	71	73	18	0.00	0.00	17,299	37,506	-54,806	-44,562
43	72	74	19	0.00	0.00	17,818		-17,818	-14,066
44	73	75	20	0.00	0.00	18,353		-18,353	-14,066
45	74	76	21	0.00	0.00	18,904		-18,904	-14,066
46	75	77	22	0.00	0.00	19,471		-19,471	-14,066
47	76	78	23	0.00	0.00	15,455		-15,455	-10,840
48	77	79		0.00	0.00	15,919		-15,919	-10,840
49	78	80		0.00	0.00	15,989	7,562	-23,552	-15,570
50	79			0.00	0.00	11,253	7,789	-7,789	-5,000
									-221,850

Finally, the court award is then estimated using (1). I assumed the liability is 100% for the death accident as in this case study.

$$\begin{aligned}
 CA &= L [P_1(SD) + P_2(GD)](1+i)^T \\
 &= 100\% [100\% (\text{cost of motorcycle repair} + \text{funeral expenses}) + 100\% (\text{loss of dependency})] (1.03)^9 \\
 &= \text{RM}292,661
 \end{aligned}$$

The result calculated using the human life value revision method in this case study is much more higher compared to the amount of RM74,450 that has been awarded by the court. This is because I considered other important factors into the computation for loss of dependency, for instance the expected salary increment, funeral expenses and cost of education for children.

#### B. *Azman Kasri & Anor v Md. Isa Endut & Government of Malaysia [1988] 1 CLJ*

Azman, the first plaintiff was knocked down from the rear by a military truck driven by the first defendant on 11 February 1982 while cycling. Injuries are briefly described as crush injury of left leg, six-inch laceration wound vertical exposing the lower end of left femur and upper end of left tibia and fibula, dislocation of left knee with separation, and lateral popliteal nerve partially torn near neck of left fibula. Left leg was subsequently amputated above the knee. The second plaintiff is the mother of the victim, which has been awarded transportation expenses to visit the first plaintiff amounting RM1,720 and expenses to buy nourishing foods for the first plaintiff for RM100. In this case study, I only estimated the court award for the first plaintiff.

The judge estimated that if not for the first plaintiff's amputated left leg, at the age of 20, he would be able to work as a rubber tapper or welder in an estate and earn about RM400 per month. The first schedule of the Workmen's Compensation Ordinance 1952 states that the loss of earning capacity of a worker for loss of a leg above the knees would be 60%. The judgement considered that the first plaintiff's loss of earning capacity to be 60% of RM400 which is RM240 per month. Thus, it give a multiplier of 24 years ( $55 - 20 = 35 * 2/3$ ), and loss of future earnings of RM39,740.

Other awards are general and special damages. General

damages for the first plaintiff are pain and suffering due to the nature of injuries to his left leg prior to amputation of the left leg for the amount of RM12,000; amputation of left leg above the knee amounting RM45,000; skin grafting and resultant scar for RM10,000. An interest at 6% per annum on general damages from date of accident to date of judgment was also awarded for the total sum of RM 171,480.

Special damages for the first plaintiff include cost for fitting artificial limb amounting RM33,600; cost for future renewal of consumptive items for the amount of RM20,640 and travelling expenses for servicing of artificial limb (3 trips per year at RM100 per trip for 35 years) for RM10,500. In total, the amount of court award for the first plaintiff that had been awarded was RM342,960.

Now, I used the human life value revision method to estimate the amount for loss of future earnings. Firstly, I developed a family lifetime model for this case study and estimated the present value of net future income of the deceased as shown in Table III. If the plaintiff's left leg is not amputated, he would be able to work and the monetary value of himself is estimated at RM96,479.

TABLE III  
CASE STUDY 2: PRESENT VALUE OF NET FUTURE INCOME OF THE VICTIM

Age of Plaintiff	Income (I)	Income Taxes (T)	Household Expenditures (ME)	Other Expenses (OE)	Surplus	Present Value
20	4,800	0	1,963		2,836	2,836
21	5,088	0	2,022		3,065	2,976
22	5,393	0	2,083		3,310	3,120
23	5,716	0	2,145		3,571	3,268
24	6,059	0	2,210		3,849	3,420
25	6,423	0	3,102		3,320	2,864
26	6,808	0	3,196		3,612	3,025
27	7,217	0	4,937		2,279	1,853
28	7,650	0	5,086		2,564	2,024
29	8,109	0	5,238		2,870	2,200
30	8,596	0	5,674		2,921	2,174
31	9,111	0	5,844		3,267	2,360
32	9,658	0	8,026		1,632	1,144
33	10,238	0	8,267		1,970	1,342
34	10,852	3	8,515		2,333	1,542
35	11,503	10	9,165		2,328	1,494
36	12,193	16	9,440		2,736	1,705
37	12,925	24	9,723		3,177	1,922
38	13,700	71	10,015		3,614	2,123
39	14,522	95	10,315		4,111	2,344
40	15,394	121	11,850		3,421	1,894
41	16,317	149	12,206		3,962	2,129
42	17,296	178	12,572		4,545	2,372
43	18,334	210	12,949		5,175	2,622
44	19,434	243	13,338		5,853	2,879
45	20,600	278	13,021		7,301	3,487
46	21,837	315	13,412		8,109	3,760
47	23,147	354	13,814		8,978	4,041
48	24,536	396	14,228		9,911	4,331
49	26,008	440	14,655		10,912	4,630
50	27,568	487	26,320		760	313
51	29,222	585	27,110		1,526	610
52	30,976	708	27,923		2,344	910
53	32,834	838	28,761		3,234	1,219
54	34,804	976	29,624		4,204	1,538
55	36,893	1,122	31,634		4,136	1,469
56	39,106	1,277	32,583		5,245	1,810
57	41,453	1,441	33,560		6,450	2,160
58	43,940	1,672	34,567		7,700	2,504
59	46,576	2,014	35,604		8,957	2,828
60	49,371	2,378	39,203		7,789	2,387
61	52,333	2,763	40,379		9,190	2,735
62	55,473	3,171	41,591	7,303	-6,592	-1,904
						96,479

Since the plaintiff had become permanently disabled as his left leg amputated above the knee, he would not be able to work. It is expected that the amount for loss of the plaintiff's future earnings is RM284,953 as shown in Table IV.

TABLE IV  
CASE STUDY 2: THE EXPECTED AMOUNT FOR LOSS OF FUTURE EARNING

Age of Plaintiff	Income (J)	Income Taxes (T)	Household Expenditures (ME)	Other Expenses (OE)	Surplus	Present Value
20	0.00	0.00	1,963		-1,963	-1,963
21	0.00	0.00	2,022		-2,022	-1,963
22	0.00	0.00	2,083		-2,083	-1,963
23	0.00	0.00	2,145		-2,145	-1,963
24	0.00	0.00	2,210		-2,210	-1,963
25	0.00	0.00	3,102		-3,102	-2,676
26	0.00	0.00	3,196		-3,196	-2,676
27	0.00	0.00	4,937		-4,937	-4,014
28	0.00	0.00	5,086		-5,086	-4,014
29	0.00	0.00	5,238		-5,238	-4,014
30	0.00	0.00	5,674		-5,674	-4,222
31	0.00	0.00	5,844		-5,844	-4,222
32	0.00	0.00	8,026		-8,026	-5,629
33	0.00	0.00	8,267		-8,267	-5,629
34	0.00	0.00	8,515		-8,410	-5,560
35	0.00	0.00	9,165		-9,060	-5,815
36	0.00	0.00	9,440		-9,335	-5,817
37	0.00	0.00	9,723		-9,618	-5,819
38	0.00	0.00	10,015		-9,675	-5,683
39	0.00	0.00	10,315		-9,975	-5,688
40	0.00	0.00	11,850		-11,510	-6,373
41	0.00	0.00	12,206		-11,866	-6,378
42	0.00	0.00	12,572		-12,232	-6,384
43	0.00	0.00	12,949		-12,609	-6,389
44	0.00	0.00	13,338		-12,998	-6,394
45	0.00	0.00	13,021		-12,681	-6,056
46	0.00	0.00	13,412		-13,072	-6,061
47	0.00	0.00	13,814		-13,474	-6,066
48	0.00	0.00	14,228		-13,888	-6,070
49	0.00	0.00	14,655		-14,315	-6,074
50	0.00	0.00	26,320		-25,980	-10,703
51	0.00	0.00	27,110		-25,650	-10,259
52	0.00	0.00	27,923		-26,463	10,276
53	0.00	0.00	28,761		-27,301	10,293
54	0.00	0.00	29,624		-28,164	10,309
55	0.00	0.00	31,634		-30,174	10,723
56	0.00	0.00	32,583		-31,123	10,738
57	0.00	0.00	33,560		-32,100	10,753
58	0.00	0.00	34,567		-30,527	-9,928
59	0.00	0.00	35,604		-31,564	-9,966
60	0.00	0.00	39,203		-35,163	-10,779
61	0.00	0.00	40,379		-36,339	-10,815
62	0.00	0.00	41,591	7,303	-54,854	-15,850
						-284,953

Finally, a court award is then calculated. I assumed the liability is 100% as the plaintiff had become totally and permanently disabled. As for the loss of future earnings, I followed the first schedule of the Workmen's Compensation Ordinance 1952, which states that the loss of earning capacity of a worker for loss of a leg above the knees would be 60%.

### C. Case Study 3: *Zulkifli Ayob v Velasini K. Mathavan & Anor [2000] 1 CLJ*

In the High Court Malaya, Kuala Terengganu (13 November 1999), the appellant was the defendant in a negligence suit brought by the plaintiffs against him. The first respondent's claim was brought pursuant to section 7 of the CLA for the benefit of the dependants of the deceased, Mathavan Kunjapoo. This accident happened on 10 August 1984. The car driven by the second respondent with the deceased as a passenger was involved in a road collision with the car driven by the appellant resulting in the injuries to the respondents and the passenger succumbed to his injuries and died later in the hospital. At the time of his death, the deceased was 36 years old. He was an independent contractor working with Petroliam Nasional Berhad (Petronas) earning a monthly income of about RM3,000. The appellant being dissatisfied

with the quantum awarded, filed an appeal. At the hearing of the appeal, the appellant limited his appeal only to the quantum awarded in respect of loss of support. It is contended for the appellant that the amount awarded was manifestly excessive for the reason that the judge based his assessment on a higher number of multiplier.

By an order of 12 June 1996, the session's judge decided that the loss of dependency was at RM1,500 per month. As the deceased died at the age of 36 years, the number of multiplier was decided to be 15 years. In the circumstances, the loss of dependency is RM270,000 based on the formula of RM1,500 per month \* 12 months \* 15 years. No reason at all was given by the judge as to how he arrived at RM1,500 per month as the monthly loss of dependency and as to how he arrived at the figure of 15 years as the multiplier. The counsel for the appellant submitted that the multiplier should be 13 years instead. He based his argument on the court case of Ahmad Nordin & Anor v Ngak Hua & ORS [1985] 2 MLJ 431. In that case, the judge decided on a multiplier of 25 years in respect of the deceased who died at the age of 24 years. This was based on the probable retiring age of 65 years. The supreme court was of the view that the retiring age should be fixed at 55 and as the deceased was 24 at the time of his death and deducting 13 years for contingencies that would leave 18 years of multiplier. The appellate court agreed that based on the principle laid down in Ahmad Nordin & Anor v Ngak Hua & ORS [1985] 2 MLJ 431, the determination that the multiplier in this case would be 13. Consequently, the court awarded RM234,000 for the loss of support. Other awards are pre-trial loss of support amounting RM211,500; funeral expenses for RM3,000 and interest at the rate of 4% per annum in respect of loss of support for the amount of RM8,460, adding to the total overall court award of RM456,960.

As I calculated in case study 1 and 2, the same model and method applied in this case study. I developed a family lifetime model for this case study and estimated the present value of net future income of the deceased as shown in Table V. If the breadwinner is still alive, the monetary value of himself would be RM372,619.

TABLE V  
CASE STUDY 3: PRESENT VALUE OF NET FUTURE INCOME OF THE DECEASED

Age of Deceased	Age of Plaintiff	Income (J)	Income Taxes (T)	Household Expenditures (ME)	Other Expenses (OE)	Surplus	Present Value
36	29	36,000	850	18,925		16,224	16,224
37	30	38,160	1,001	19,493		17,665	17,151
38	31	40,449	1,161	20,077		19,210	18,107
39	32	42,876	1,331	20,680		20,864	19,094
40	33	45,449	1,511	22,359		21,578	19,171
41	34	48,176	1,832	29,472		16,870	14,552
42	35	51,066	2,208	30,356		18,501	15,494
43	36	54,130	2,606	31,267		20,256	16,470
44	37	57,378	3,029	32,205		22,144	17,480
45	38	60,821	3,476	37,108		20,236	15,509
46	39	64,470	4,159	38,221		22,089	16,436
47	40	68,338	4,894	39,368		24,076	17,393
48	41	72,439	5,673	44,186		22,579	15,836
49	42	76,785	6,499	45,511		24,774	16,870
50	43	81,392	7,444	40,350		34,597	22,873
51	44	86,276	7,616	44,981		33,678	21,616
52	45	91,452	8,858	46,331		36,262	22,597
53	46	96,939	10,175	51,350		35,414	21,426
54	47	102,756	11,571	52,890		38,294	22,493
55	48	108,921	13,051	50,599		45,271	25,817

372,619

Next, I estimated the loss of support using the human life value revision method. I ignored social security's benefit (SOCSSO) for the reason that under the Employees' Social Security Act 1969 and the Employees' Social Security (General) Regulations 1971, an employee earning a monthly income of RM2,000 or above is not obligatory contribute to SOCSSO.

Table VI shows the computations, and it is expected that the amount for loss of the plaintiff's future earnings is RM519,976. As an employee of Petronas, the deceased contributed a percentage of his salary into EPF. Thus, the amount of RM519,976.05 is then subtracted from the projected EPF savings, which could be withdrawn by the next-of-kin in the event of death of the breadwinner. I also assumed the deceased entered into labour force when he was at the age of 22, therefore  $n = 14$ .

TABLE VI  
CASE STUDY 3: THE EXPECTED AMOUNT FOR LOSS OF SUPPORT

Age of Plaintiff	Income (I)	Income Taxes (T)	Household Expenditures (ME)	Other Expenses (OE)	Surplus	Present Value
36	0.00	0.00	18,925		-18,925	-18,925
37	0.00	0.00	19,493		-19,493	-18,925
38	0.00	0.00	20,077		-20,077	-18,925
39	0.00	0.00	20,680		-20,680	-18,925
40	0.00	0.00	22,359		-22,359	-19,866
41	0.00	0.00	29,472		-29,472	-25,423
42	0.00	0.00	30,356		-30,356	-25,423
43	0.00	0.00	31,267		-31,267	-25,423
44	0.00	0.00	32,205		-32,205	-25,423
45	0.00	0.00	37,108		-37,108	-28,440
46	0.00	0.00	38,221		-38,221	-28,440
47	0.00	0.00	39,368		-39,368	-28,440
48	0.00	0.00	44,186		-44,186	-30,991
49	0.00	0.00	45,511		-45,511	-30,991
50	0.00	0.00	40,350		-40,350	-26,676
51	0.00	0.00	44,981		-44,981	-28,872
52	0.00	0.00	46,331		-46,331	-28,872
53	0.00	0.00	51,350		-51,350	-31,067
54	0.00	0.00	52,890		-52,890	-31,067
55	0.00	0.00	50,599		-50,599	-28,856
						-519,976

The projected EPF savings is

$$= 12Xk(1+d)^{n-1} * \left[ \frac{\left(\frac{1+s}{1+d}\right)^n - 1}{\left(\frac{1+s}{1+d}\right) - 1} \right], \text{ if } s > d = \text{RM}102,898$$

Therefore, the estimated amount for loss of future earnings after subtracting EPF savings is RM417,077.

Next, a court award is then calculated. I assumed the liability is 100% for the death accident as in this case study.

$$\begin{aligned} CA &= L [P_1(SD) + P_2(GD)](1+i)^T \\ &= 100\% [100\% (\text{funeral expenses}) + 100\% (\text{loss of future earning})] (1.03)^{15} \\ &= \text{RM}654,466 \end{aligned}$$

Using the human life value revision method, the expected amount for the court award is RM654,466, which is much higher than what had been awarded by the court.

#### IV. CONCLUSION

When assessing economic loss in personal injury and death litigation, courts often use traditional multiplicand-multiplier method. The objective is to calculate a lump sum amount to compensate the plaintiff for a stream of future lost earnings. Most judges select the multipliers by reference to past court decisions and had little scientific basis. Within the legal profession, there has been concern that there is too much uncertainty involved in calculating the multiplier. It has been described as 'an arbitrary process', in which the multiplier is not calculated in a precise or logical manner [5]. In particular, the multiplier takes virtually no account of the factors that influence the way an individual's earnings change over time.

In personal injury and death litigation, the object of valuation is the value of a life. This research has developed a scientific model using the human live value method with few revisions that can be used as a guide to determine the amount of court award in personal injury and death litigation, which focuses only on the economic losses in special and general damages, particularly on the loss of future earning capacity and the dependency claim. Non-economic losses are ignored in the model. Non-economic losses are awarded with respect to the 'pain and suffering' endured and be awarded by judges based on previous court cases.

To compute economic losses, it is necessary to take into consideration factors affecting the monetary value of a human life such as salary increment, social security, taxes, household expenditures, funeral expenses, children education costs, inflation, retirement age and life expectancy. As such, a lifetime model of the plaintiff need to be constructed from which to begin projections of economic value lost in future years. The human life value revision method is then applied to the model. In the application of the human life value revision method, I compute the expected amount for loss of dependency in the event of death of the breadwinner, or the estimated amount for loss of future earnings in the event of personal injury. Finally, using a general model formulation, a court award is then calculated. This amount could be a guide to determine the appropriate amount of court award in personal injury and death litigation.

#### REFERENCES

- [1] J. Ward, "Economic Damages in Personal Injury and Death in the UK and Ireland: A Comparison with Damages Assessment in the United States and Canada," presented at the Allied Social Science Associations Conference, Philadelphia, Pennsylvania, January 7-9, 2005.
- [2] C.C. Fischer, "The Valuation of Household Production: Divorce, Wrongful Injury and Death Litigation," *American Journal of Economics and Sociology*, vol. 53, pp. 187-201, 1994.
- [3] A.C. Martin, J.W. Beardmore, A.P. Gallop, P.G. Kennedy, J.L. McKenzie, R. Owen, C.C. Patel, C.T. Pettengell and P.W. Wright, "Damages: Personal Injury Awards," presented at a Seminar of Institute of Actuaries, London, December 9, 1997.
- [4] H. Haslifah, "The Revision Method of Human Life Value and Needs Analysis," Ph.D dissertation, School of Finance, Actuarial Science and Applied Statistics, Australian National University, Canberra, 2008.
- [5] R. Lewis, R. McNabb, H. Robinson and V. Wass, "Loss of Earnings Following Personal Injury: Do the Courts Adequately Compensate Injured Parties?," *Economic Journal*, vol. 113, pp. 568-584, 2003.