

ORIGINAL ARTICLES

Comparison Of Premium Life Tables Between Existing Model And Integration Model In Family Takaful

Puspa Liza Ghazali, Ismail Mohd, Wan Muhamad Amir W Ahmad, Mustafa Mamat.

Department of Mathematics, Fakulti Sains dan Teknologi, Universiti Malaysia Terengganu (UMT), 21030Kuala Terengganu, Malaysia.

ABSTRACT

Education plan takaful is one of the product plans in Family Takaful. The researchers strongly believe that the present premium life tables must be amended to make it a more reasonable plan for all categories of income earners. This new proposed model of premium life tables is called integration model. This research paper will compare the premium life tables of the existing model and the integration model for two types of Family Takaful model; the Mudharabah and Wakala. The focus will be on Surrender Value, Maturity Value and Death Coverage. The results of the research will show that the integration model is more inclusive than the existing model in premium life tables for clients to earn more money in the future.

Key words: Premium life table, surrender value, maturity value and death coverage.

Introduction

Islamic jurists resolved that the system of insurance, which falls within the confines of Islamic framework, should be founded on the concept of al-Takaful. An Islamic insurance transacting is a policy of mutual cooperation, solidarity and brotherhood against unpredicted risk or catastrophes, in which the parties involved are expected to contribute genuinely. The nature of the principles of Takaful is fundamentally different from the principles of conventional insurance. An attempt is however made in this paper to analyze the conceptual framework of Takaful practices in the contemporary economic reality.

The widely differing attitudes of Muslim scholars on the Islamically validity of insurance can be grouped under three broad categories which are called 'Riba', 'Gharar' and 'Maisir' as follows (Siddiq, 1980).

Riba shows the money that has been collected through premiums is invested by the insurance company in interest-bearing deposits, un-Islamic business or dealings. Thus clearly the participants have to pay more for the premium in their businesses. The prohibition of riba interpretation by Muslehuddin (1982) is accepted by almost all the Muslim jurists and it is an absolute prohibition which covers simple and compound interests and productive as well as non-productive loans.

Gharar refers to uncertainty. Gharar could be described as the lack of transparency in a given transaction. One of the underlying objectives of Islamic finance is to prevent dealings involving uncertainty, hazard, chance or uncontrollable risk leading to speculation. There is difference in juristic opinion on the tolerable level of Gharar. A distinction is drawn between Gharar yasir (minor Uncertainty) and Gharar Jahish (excessive uncertainty). Contemporary Muslim thinkers assert that what the Sunnah prohibits is Gharar Jahish which is not presented in the contract of Insurance (Siddiq, 1985).

The Holy Al-Quran prohibits Maisir (11:219 and V:50, 2008) is taken from Siddiqi (1985). Insurance is sometimes equated with gambling, Maisir or wagering. But some jurists counter this allegation by arguing:

"The financial motivation of gambling is provided by the gain in the event of winning, while in the case of insurance it consists in the desire to have protection against loss. The amount received by the insured cannot be considered as profit since it only provides him relief from the burden of loss that he has already incurred. The money won by the gambler is in the nature of profit".

The Models in Family Takaful:

As mentioned in (Zainol, 2005), there exists two differences between conventional and takaful insurances which involve the investments of the assets and the treatment of expenses and surplus. In Takaful insurance all the investments are made in halal (permissible) assets and the treatment of the trading also are made in halal practices. The takaful operator's fund is based on two models of family takaful so-called Mudharabah and Wakala Models which will be described as follows.

In this model, the participant gets the amount accumulated in his participant account when he submits the early surrender. At his death, his beneficiaries will get the sum of the Death Coverage, in addition to the amount accumulated in his participant account. Mudharabah gives the right to the contracting parties to share the profit while liability for losses is borne by the participants. The product is based on profit sharing to cover the acquisition expenses, included commissions (Yaquby, 2001). The contract specifies; the profit (surplus) from the Takaful Company operators is to be shared between the providers of the capital and the entrepreneur (Billah, 2003).

The sharing of such profit may be in a ratio 50:50, 60:40, 70: 30 and others as mutually agreed between the contracting parties. The principle of mudharabah (sleeping partnership) provides the specific details of the takaful contract (Syed, 1991). The cooperative of profit risk-sharing occurs among participants yet the Takaful Operator shares also in any operating surplus as a reward for its careful underwriting on behalf of participants.

Wakala is a form of representative relationship between Takaful Company and a participant. Takaful operator earns a fee for services rendered while liability for losses is borne by the participants. The operating company does not share in the underwriting result, but rather it is compensated by a fee deducted from contributions made by participants and/or investment profits generated by the takaful fund. The fee rate is fixed annually in advance in consultation with the Shariah committee of the company (Billah, 2003).

In order to give incentive for good governance, the management fee is related to the level of performance. The surplus of the takaful fund belongs to the members; the operating company does not have a claim on it under any circumstances. If the takaful operator is to generate a profit from its efforts, it must manage the operations (including salaries, overhead, selling commissions, sales and marketing expenses, etc) entirely within the disclosed wakala fees (Fazli, 1996).

New Idea Of Premium Life Table Model:

The proposed model of new premium life table in education plan has to combine all the riders in one plan and the name be changed to Economic Education Plan Takaful. The rider should include health, accident, hospital costs, loss of effort to work, critical illnesses, education, death benefit, death coverage and also pension. Life insurance or family takaful is needed for everyone in the modern world, so the product must be affordable to every category of income earners.

This new plan offers complete riders for two people in one product plan; the participant and a child. The monthly premium is reasonable to all categories income earners. The plan offers buying multiple units for the product business. If the participant buys more than 1 unit, the value of premium, riders, surrender value and maturity value have to be multiplied by the numbers of units bought by the participant.

Methodology:

The Muslims need a new insurance or takaful which can covers mostly of their risks. In this method, clients proposal need to add more riders as shown in Table 3(a).

Table 3(a): Client Proposal

| NUMBERS | THINGS | VALUES |
|---------|--|------------|
| 1 | Monthly payment | RM Y |
| 2 | Female non smoker | K year old |
| 3 | Period Term | N year |
| 4 | Interest Rate | R per year |
| 5 | Monthly saving | RM p |
| 6 | Tabarru Account | RM j |
| 7 | Surrender Values | RM t |
| 8 | Death Coverage | RM10 x |
| 9 | Khariat | RM2 x |
| 10 | Loss An Effort To Work/ 40 critical illnesses | RM10 x |
| 11 | Hospital Bills | RM5 x |
| 12 | Pension | 0.3 x |

From Table 3(a), the client proposal need many riders such as death coverage, death benefit, Khariat, loss of effort to work or 40 critical illnesses, hospital bills and pension. After a discussion with many Muslim, the researcher realises that they need a detailed client premium life table to avoid uncertainty in their business as shown in Table 3(b) (Ghazali, 2010).

Let Q_1 is the year, Q_2 is the age, Q_3 is the layout payment, Q_4 is the Tabarru account, Q_5 is the personal account, Q_6 is the surrender value, Q_7 is the Khiarat, Q_8 is the loss an effort to work or 40 critical illnesses, Q_9 is the death coverage, Q_{10} is the hospital bills, Q_{11} is the pension and Q_{12} is the death benefit.

Table 3(b): Client Quotation of Mudharabah Model for $i=1,2,3,\dots,17$

| Q_1 | Q_2 | Q_3 | Q_4 | Q_5 | Q_6 | Q_7 | Q_8 | Q_9 | Q_{10} | Q_{11} | Q_{12} |
|-------|-------|-------|--------------|-------|-------|-------|-------|-------|----------|----------|----------|
| n_i | k_i | 12iy | $i(12y - w)$ | p_i | t_i | $2x$ | 10x | 10x | 5x | 0.3x | |

The Table 3(b) is used for Mudharabah model because the Wakala fee is not includes in the above table.

Table 3(c): Client Quotation of Wakala Model for $i=1,2,3,\dots,17$

| Q_1 | Q_2 | Q_3 | Q_4 | Q_5 | Q_6 | Q_7 | Q_8 | Q_9 | Q_{10} | Q_{11} | Q_{12} | Q_{13} |
|-------|-------|-------|--------------|-------|-------|-------|-------|-------|----------|----------|----------|----------|
| r_i | k_i | 12iy | $i(12y - w)$ | p_i | t_i | $2x$ | 10x | 10x | 5x | 0.3x | | |

Table 3(c) is used for Wakala model because it has the Wakala fee as shown in Q_{13} .

From Table 3(b) and Table 3(c), the value of Q_7 to Q_{11} are in ratio items where if the value of x is RM1 000, so the value of hospital bills is RM5 000.

Numerical Results:

In numerical result, the researcher wants to construct the integration model of premium life tables which are according to the basic models in family takaful (Mudharabah and Wakala) and compare it to the existing model.

4.1 Mudharabah Model of Integration Model:

Premium life table uses Mudharabah model in education plan takaful of Integration model shown as below. (Ghazali *et al.*, 2012).

- Monthly payment = RM50 (1 unit)
- Term = 17 years
- Interest Rate = 5 % per year (i)
- Tabarru` Account = RM 20
- Saving Account = RM30

Below are the symbols of elements in Mudharabah model where the static premium of life table (Q_3 , Q_4 and Q_5) and static benefit (Q_6 to Q_{13}) shown in the Table 5.1.1(a).

1. Q_1 is year
2. Q_2 is age
3. Q_3 is layout payment
4. Q_4 is tabarru account
5. Q_5 is personal account
6. Q_6 is monthly profit
7. Q_7 is yearly profit
8. Q_8 is total surrender value
9. Q_9 is khiarat
10. Q_{10} is loss an effort to work or 40 critical illnesses
11. Q_{11} is death coverage
12. Q_{12} is hospital bills
13. Q_{13} is pension
14. Q_{14} is death benefit

Table 4.1(a): Client Quotation of Mudharabah Integration Model

| Q_1 | Q_2 | Q_3 | Q_4 | Q_5 | Q_6 | Q_7 | Q_8 | Q_9 | Q_{10} | Q_{11} | Q_{12} | Q_{13} | Q_{14} |
|-------|-------|-------|-------|------------------|-------|-------|------------------|-------|----------|----------|----------|----------|----------|
| 1 | 1 | 600 | 240 | 360 (P_1) | 8 | 18 | 386 (T_1) | 2000 | 10000 | 10000 | 5000 | | |
| 2 | 2 | 1200 | 480 | 720 (P_2) | 57 | 36 | 813 (T_2) | 2000 | 10000 | 10000 | 5000 | 300 | |

| | | | | | | | | | | | | | |
|----|----|-------|------|----------------------------|-----|-----|----------------------------|------|-------|-------|------|-----|--|
| 3 | 3 | 1800 | 720 | 1080 (P ₃) | 110 | 54 | 1244 (T ₃) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 4 | 4 | 2400 | 960 | 1440 (P ₄) | 164 | 72 | 1676 (T ₄) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 5 | 5 | 3000 | 1200 | 1800 (P ₅) | 218 | 90 | 2108 (T ₅) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 6 | 6 | 3600 | 1440 | 2160 (P ₆) | 272 | 108 | 2540 (T ₆) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 7 | 7 | 4200 | 1680 | 2520 (P ₇) | 326 | 126 | 2972 (T ₇) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 8 | 8 | 4800 | 1920 | 2880 (P ₈) | 380 | 144 | 3404 (T ₈) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 9 | 9 | 5400 | 2160 | 3240 (P ₉) | 434 | 162 | 3836 (T ₉) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 10 | 10 | 6000 | 2400 | 3600 (P ₁₀) | 488 | 180 | 4286 (T ₁₀) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 11 | 11 | 6600 | 2640 | 3960 (P ₁₁) | 542 | 198 | 4700 (T ₁₁) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 12 | 12 | 7200 | 2880 | 4320 (P ₁₂) | 596 | 216 | 5132 (T ₁₂) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 13 | 13 | 7800 | 3120 | 4680 (P ₁₃) | 650 | 234 | 5564 (T ₁₃) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 14 | 14 | 8400 | 3360 | 5040 (P ₁₄) | 704 | 252 | 5996 (T ₁₄) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 15 | 15 | 9000 | 3600 | 5400 (P ₁₅) | 756 | 270 | 6426 (T ₁₅) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 16 | 16 | 9600 | 3840 | 5740 (P ₁₆) | 812 | 288 | 6840 (T ₁₆) | 2000 | 10000 | 10000 | 5000 | 300 | |
| 17 | 17 | 10200 | 4080 | 6120 (P ₁₇) | 863 | 306 | 7289 (T ₁₇) | 2000 | 10000 | 10000 | 5000 | 300 | |

The derivation of Q6 to Q8 in the Table 4.1(a) shown as below.

1. $.360 + (30 * 5/100 * (66 + 0)) * 1/12 + (360 * 5/100) = 360 + 8 + 18 = 386$
2. $720 + (30 * 5/100 * (66 + 386)) + (720 * 5/100) = 720 + 57 + 36 = 813$
3. $1080 + (30 * 5/100 * (66 + 813)) + (1080 * 5/100) = 1080 + 110 + 54 = 1244$
4. $1440 + (30 * 5/100 * (66 + 1244)) + (1440 * 5/100) = 1440 + 164 + 72 = 1676$
5. $1800 + (30 * 5/100 * (66 + 1676)) + (1800 * 5/100) = 1800 + 218 + 90 = 2108$

$$P_n + (P * i/100 * (66 + T_{n-1})) + (P_n * 5/100) \text{ where } n = 1, 2, 3, 4, 5, \dots$$

The general formula of Table 4.1(a) shown in the Table 4.1(b) given as follows.

Table 4.1(b): General Formula of Mudharabah Integration Model

| Symbols of elements | Q3 | Q4 | Q5 | Q6 To Q8 | Q9 | Q10 | Q11 | Q12 | Q13 |
|---------------------|------|-----------|-----------|---|----|-----|-----|-----|------|
| Formula of elements | 600n | 0.4(600n) | 0.6(600n) | $P_n + [P * i/100 * (66 + T_{n-1})] + (P_n * 5/100)$ where $n = 1, 2, 3, \dots$ | 2x | 10x | 10x | 5x | 0.3x |

The premium life table shows that premium covers a child in the death coverage and pension for the participant. This model covers other riders such as health, accident, hospital costs, loss of effort to work, critical illnesses, education and also pension (Ghazali, 2010).

Based on the client quotation of a family takaful as shown in table 4.1(a), we find that the table has detailed information. We see that the total payment for 17 years is RM10 200. The participant can earn RM7 289 for his child's education with the management fee of RM150. Therefore, the net maturity value is RM7 289 – RM150 which comes to RM7 139. If the participant insures for 3 units so the maturity value is RM21 417. The riders also multiplies by 3. So the death coverage for a participant is RM30 000 if the child dies and there is a pension of RM900 for the child if the participant dies.

4.1.1 Mudharabah Model of Existing Model:

Premium life table uses Mudharabah model in education plan takaful of the existing model shown as below.

Table 4.1.1: Client Quotation of Mudharabah Existing Model

| Child Age | Money outlay | Insured Account (P _i) | Special Account | Profit | Total | Child Death | Insured Death |
|-----------|--------------|-----------------------------------|-----------------|--------|-------|-------------|---------------|
| 4 | 600 | 544 | 56 | 27 | 571 | 1571 | 8800 |
| 5 | 1200 | 1088 | 112 | 83 | 1171 | 2171 | 8200 |
| 6 | 1800 | 1633 | 167 | 169 | 1801 | 2801 | 7600 |
| 7 | 2400 | 2177 | 223 | 386 | 2463 | 3463 | 7000 |
| 8 | 3000 | 2721 | 279 | 436 | 3157 | 4157 | 6400 |
| 9 | 3600 | 3265 | 335 | 621 | 3887 | 4887 | 5800 |
| 10 | 4200 | 3809 | 391 | 843 | 4652 | 5652 | 5200 |
| 11 | 4800 | 4354 | 446 | 1103 | 5456 | 6456 | 4600 |
| 12 | 5400 | 4898 | 502 | 1403 | 6301 | 7301 | 4000 |
| 13 | 6000 | 5442 | 558 | 1745 | 7187 | 8187 | 3400 |
| 14 | 6600 | 5986 | 614 | 2132 | 8118 | 9118 | 2800 |
| 15 | 7200 | 6530 | 670 | 2565 | 9095 | 10095 | 2200 |
| 16 | 7800 | 7075 | 725 | 3047 | 10121 | 11121 | 1600 |
| 17 | 8400 | 7619 | 781 | 3580 | 11199 | 12199 | 1000 |

Derivation of General Formulation in Mudharabah Model:

The general formula from a particular client quotation uses the derivation method by using the data in the Table 4.1.2. Therefore, the general formulation in Mudharabah existing model is given as below (Ghazali, 2010).

Table 4.1.2: General Formulation of Mudharabah Existing Model

| Year <i>i</i> | Insured Account <i>P_i</i> | Total of the Insured Account <i>Q_i</i> | Profit of the Total Insured Account <i>Q_ir</i> | Total Profit Per Year <i>T_i</i> | Child Death <i>T_i + 1000</i> | Insured Death <i>D_i</i> |
|---------------|--------------------------------------|---|---|--|---|---|
| <i>i</i> | <i>P_i</i> | <i>Q_i</i> | $Q_i = P_i + \sum_{j=1}^{i-1} T_{i-j}$ $\left(\begin{matrix} i = 2,3,.. \\ ..,14; \\ Q_1 = P_1 \end{matrix} \right)$ | $T_i = P_i + Q_i r$ $\left(\begin{matrix} i = 1,2,3,.. \\ ..,14 \end{matrix} \right)$ | $C_i = T_i + 1000$ $\left(\begin{matrix} i = 1,2,3, \\ ..,14 \end{matrix} \right)$ | $D_i = D_{i-1} - 600$ $\left(\begin{matrix} i = 2,3,.. \\ ..,14; \\ D_1 = 8800 \end{matrix} \right)$ |

The generalization for year n in profit of the total insured account is shown as below.

$$P_n(1+r) + P_{n-1}r(1+r) + \dots + P_3r(1+r)^{n-3} + P_2r(1+r)^{n-2} + P_1r(1+r)^{n-1}$$

The premium life table shows that premium covers the participant and a child in the death coverage and death benefit. The weakness of this model, it is does not cover other riders such as health, accident, hospital costs, loss of effort to work, critical illnesses, education and also pension (Ghazali, 2010).

Based on the client quotation of a family takaful as shown in table 2.1, the table has detailed information. The total payment for 14 years is RM8 400. The participant can earn RM11 199 for his child’s education with the management fee of RM150. Therefore, the net maturity value is RM11 199 – RM150 which comes to RM11 049 (Ghazali *et al.*, 2011).

If the child dies after 8 years of being insured, the participant will earn the surrender value (included death coverage) of his child of RM6 456. But if the participant dies after 8 years of being insured, the child will earn RM4 600 for insured death and he will also earn the death benefit for the premium payment until he can earn the maturity value of RM11 199 (Ghazali *et al.*, 2011).

Wakala Model of Integration Model:

Premium life table uses Wakala model in education plan takaful of Integration model is shown below. (Ghazali *et al.*, 2012)

Monthly Payment = RM50 (1 unit)

Term = 17 years

Interest Rate = 5 % per year (i)

Below are the symbols of elements in Wakala model where the static premium of life table (Q3 to Q6) and static benefit (Q7 to Q14) shown in the Table 4.2.(a).

Q1 is year

Q2 is age

Q3 is layout payment

Q4 is tabarru account

Q5 is wakala fees

Q6 is personal account

Q7 is monthly profit

Q8 is yearly profit

Q9 is total surrender value

Q10 is khiarat

Q11 is loss an effort to work or 40 critical illnesses

Q12 is death coverage

Q13 is hospital bills

Q14 is pension

Q15 is death benefit

Table 4.2a: Client Quotation of Wakala Integration Model

| Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 | Q12 | Q13 | Q14 | Q15 |
|----|----|-------|------|------|----------------------------|-----|-----|----------------------------|------|-------|-------|------|-----|-----|
| 1 | 1 | 600 | 240 | 60 | (P ₁) 300 | 7 | 15 | (P ₁) 322 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 2 | 2 | 1200 | 480 | 120 | (P ₂) 600 | 40 | 30 | (P ₂) 670 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 3 | 3 | 1800 | 720 | 180 | (P ₃) 900 | 77 | 45 | (P ₃) 1022 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 4 | 4 | 2400 | 960 | 240 | (P ₄) 1200 | 113 | 60 | (P ₄) 1373 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 5 | 5 | 3000 | 1200 | 300 | (P ₅) 1500 | 150 | 75 | (P ₅) 1725 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 6 | 6 | 3600 | 1440 | 360 | (P ₆) 1800 | 187 | 90 | (P ₆) 2077 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 7 | 7 | 4200 | 1680 | 420 | (P ₇) 2100 | 223 | 105 | (P ₇) 2428 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 8 | 8 | 4800 | 1920 | 480 | (P ₈) 2400 | 260 | 120 | (P ₈) 2780 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 9 | 9 | 5400 | 2160 | 540 | (P ₉) 2700 | 296 | 135 | (P ₉) 3131 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 10 | 10 | 6000 | 2400 | 600 | (P ₁₀) 3000 | 333 | 150 | (P ₁₀) 3483 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 11 | 11 | 6600 | 2640 | 660 | (P ₁₁) 3300 | 370 | 165 | (P ₁₁) 3835 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 12 | 12 | 7200 | 2880 | 720 | (P ₁₂) 3600 | 406 | 180 | (P ₁₂) 4186 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 13 | 13 | 7800 | 3120 | 780 | (P ₁₃) 3900 | 443 | 195 | (P ₁₃) 4538 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 14 | 14 | 8400 | 3360 | 840 | (P ₁₄) 4200 | 480 | 210 | (P ₁₄) 4890 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 15 | 15 | 9000 | 3600 | 900 | (P ₁₅) 4500 | 516 | 225 | (P ₁₅) 5241 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 16 | 16 | 9600 | 3840 | 960 | (P ₁₆) 4800 | 553 | 240 | (P ₁₆) 5593 | 2000 | 10000 | 10000 | 5000 | 300 | |
| 17 | 17 | 10200 | 4080 | 1020 | (P ₁₇) 5100 | 589 | 255 | (P ₁₇) 5944 | 2000 | 10000 | 10000 | 5000 | 300 | |

The derivation of Q7 to Q9 in the Table 4.2(a) shown as below.

- $300 + (25 * 5/100 * (66 + 0)) + (300 * 5/100) = 300 + 7 + 15 = 322$
- $600 + (25 * 5/100 * (66 + 322)) + (600 * 5/100) = 600 + 40 + 30 = 670$
- $900 + (25 * 5/100 * (66 + 670)) + (900 * 5/100) = 900 + 77 + 45 = 1022$
- $1200 + (25 * 5/100 * (66 + 1022)) + (1200 * 5/100) = 1200 + 113 + 60 = 1373$
- $1500 + (25 * 5/100 * (66 + 1373)) + (1500 * 5/100) = 1500 + 150 + 75 = 1725$

$$P_n + [P * i/100 * (66 + T_{n-1})] + (P_n * 5/100) \text{ where } n = 1, 2, 3, 4, 5, \dots$$

The general formula of Table 4.2.(a) shown in the Table 4.2(b) given as follows.

Table 4.2(b): General Formula of Wakala Integration Model

| | | | | | | | | | | |
|---------------------|------|-----------------|-----------------|-----------------|---|-----|-----|-----|-----|------|
| Symbols of elements | Q3 | Q4 | Q5 | Q6 | Q7 to Q9 | Q10 | Q11 | Q12 | Q13 | Q14 |
| Formula of elements | 600n | 0.4n. (600n) | 0.1n. (600n) | 0.5n. (600n) | $P_n + [P * i/100 * (66 + T_{n-1})] + (P_n * 5/100) \text{ where } n = 1, 2, 3, \dots$ | 2x | 10x | 10x | 5x | 0.3x |

The premium life table shows that the premium covers a child in the death coverage and pension for the participant. This model cover for other riders such as health, accident, hospital costs, loss of effort to work, critical illnesses, education and also pension (Ghazali, 2010).

Based on the client quotation of a family takaful as shown in table 4.2(a), the table has detailed information. The total payment for 17 years is RM5 944. The participant can earn RM5 944 for his child’s education without the management fee. Therefore, the net maturity value is RM5 944. If the participant is insured for 3 units, the maturity value is RM17 382. The riders also multiplies by 3, so the death coverage for the participant is RM30 000 if the child dies and there is a pension of RM900 for the child if the participant dies. In the Wakala model, the participants need to pay more premiums because the Wakala fee has to be paid every month. Therefore, the participant will earn less in maturity value or surrender value compared to the Mudharabah model.

Wakala Model of Existing Model:

Premium life table uses Wakala model in education plan takaful as shown below.

4.2.1: Table of Illustration Plan:

| Number of Year | Monthly Payment in a Year M | Cumulative Payment Outlay | Cumulative Profit of Personal Account Cn | Basic Coverage Y | Death | Total Coverage T | Death |
|----------------|-----------------------------|---------------------------|--|------------------|-------|------------------|-------|
| 1 | 1 800 | 1 800 | 0 | 141 000 | | 141 000 | |
| 2 | 1 800 | 3 600 | 190 | 141 000 | | 141 190 | |
| 3 | 1 800 | 5 400 | 1 150 | 141 000 | | 142 150 | |
| 4 | 1 800 | 7 200 | 2 637 | 141 000 | | 143 637 | |
| 5 | 1 800 | 9 000 | 4 207 | 141 000 | | 145 207 | |
| 6 | 1 800 | 10 800 | 5 862 | 141 000 | | 146 862 | |
| 7 | 1 800 | 12 600 | 7 609 | 141 000 | | 148 609 | |
| 8 | 1 800 | 14 400 | 9 452 | 141 000 | | 150 452 | |
| 9 | 1 800 | 16 200 | 11 396 | 141 000 | | 152 396 | |
| 10 | 1 800 | 18 000 | 13 447 | 141 000 | | 154 447 | |
| 11 | 1 800 | 19 800 | 15 611 | 141 000 | | 156 611 | |
| 12 | 1 800 | 21 600 | 17 894 | 141 000 | | 158 894 | |
| 13 | 1 800 | 23 400 | 20 302 | 141 000 | | 161 302 | |
| 14 | 1 800 | 25 200 | 22 843 | 141 000 | | 163 843 | |
| 15 | 1 800 | 27 000 | 25 523 | 141 000 | | 166 523 | |
| 16 | 1 800 | 28800 | 28 351 | 141 000 | | 169 351 | |

The premium life table shows that the premium covers only a child in the death coverage and death benefit for the participant. So another weakness in this model is, it does not cover other riders such as health, accident, hospital costs, loss of effort to work, critical illnesses and also pension (Ghazali, 2010).

Based on the client quotation of a family takaful as shown in table 4.2.1, the table has detailed information. The total payment for 16 years is RM28 800. However, the participant will just earn RM28 351 for his child’s education. Management fee is not included in this model because it already has Wakala fees. In the Wakala model, the participants need to pay more premiums because Wakala fees have to be paid every month (Ghazali et al., 2011).

Derivation of General Formulation in Wakala Model:

The general formula from a particular client quotation uses the derivation method by using the data in the Table 4.2.2. Therefore, the general formulation in Wakala existing model had is given below.

Table 4.2.2: General Formulation of Wakala Existing Model

| Year | Monthly Payment in a Year (Total) | Cumulative Payment Outlay | Cumulative Profit of Personal Account | Total Death Coverage |
|------|-----------------------------------|---------------------------|---------------------------------------|----------------------|
| n | M_n | $\sum_{i=1}^n M_i$ | $C_n = (M_n I + C_{n-1})(1 + r)$ | $Y + C_n$ |

In Table 4.2(d), M_n is a total monthly payment in year n , I is a percentage of personal account in decimal, C_n is cumulative profit of personal account for year n , and r is an interest rate in a year.

The premium life table shows that premium covers the child in the death coverage of a child and death benefit for the participant. The weakness in this model is, it does not covers other riders such as health, accident, hospital costs, loss of effort to work, critical illnesses, education and also pension.

Based on the client quotation of a family takaful as shown in Table 4.2.1 the table detailed information. The total payment for 17 years is RM28 800 but the participant can earn RM28 351 for his child's education without management fee. Therefore, the net maturity value is RM28 351 (Ghazali *et al.*, 2011).

If the child dies after 8 years of being insured, the participant will earn the surrender value (included death coverage) of his child is RM150 425 for his child. However, if the participant dies after 8 years of being insured, the child will not earn anything except the death benefit, which will give him RM28 351 after 16 years (Ghazali *et al.*, 2011).

Discussion:

In Mudharabah of Existing model, the premium life table shows that the premium covers the participant and a child in the death benefit and death coverage respectively. The participant can earn RM11 199 for his child's education but the net of the maturity value is RM11 199 – RM150 which comes to RM11 049. The participant will earn the surrender value of his child of RM6 456. But if the participant dies after 8 years of being insured, the child will earn RM4 600 for insured death and he will earn also the death benefit for the premium payment until he can earn the maturity value of RM11 199 (Ghazali *et al.*, 2011).

On the other hand, in Mudharabah Integration model, the model covers other riders such as health, accident, hospital costs, loss of effort to work, critical illnesses, education and also pension (Ghazali, 2010). The total payment for 17 years is RM10 200 and the maturity value is RM7289 – RM150 which comes to RM7 139. If the participant is insured for 3 units, the maturity value is RM21 417. The riders also multiplies by 3 so the death coverage for participant come to RM30 000. If the participant dies the pension is RM900 for his child but if the child dies before maturity, the participant will get the surrender value plus the death coverage.

In Wakala existing model, the premium life table shows that the premium covers a child in the death coverage and death benefit for participant. The total payment for 16 years in this model is RM28 800 but the participant can only earn RM28 351 for his child's education. Management fee is not included in this model because it already has Wakala fee. In Wakala model, the participants need to pay more premiums because Wakala fee has to be paid every month. If a child dies after 8 years of being insured, the participant will earn the surrender value (including death coverage) of RM150 425. However, if the participant dies after 8 years of being insured, the child will not earn anything except the death benefit by which he can earn RM28 351 after 16 years. (Ghazali *et al.*, 2011)

The premium life table shows that the premium covers a child in the death coverage and pension for the participant. This model covers other riders such as health, accident, hospital costs, loss of effort to work, critical illnesses, education and also pension (Ghazali, 2010). The total payment for 17 years is RM5 944. The participant can earn RM5 944 for his child's education without the management fee. If the participant is insured for 3 units, the maturity value is RM17 382. The riders also multiplies by 3, the death coverage for the participant is RM30 000 if the child dies and there will be a pension of RM900 for the child if the participant dies. In the Wakala model, the participant needs to pay more premiums because the Wakala fee has to be paid every month. Therefore, the participant will earn less in the maturity value or the surrender value compared to the Mudharabah model.

Conclusion:

Based on the mathematical analysis, we can form two conclusions. They are;

- i. The Integretion model of family takaful gives the clients more benefits in riders and also cover the risks for two: the participant and a child.
- ii. The existing model of family takaful is more beneficial to the takaful company because the clients have to pay high premiums for more benefits in riders.

The new product in premium life table will give a better perception of family takaful business because the plan offers affordable price for all categories of income earners and it also includes almost complete riders such as health, accident, hospital costs, loss of effort to work, critical illnesses, education and also pension. This research paper will prove that clients will be better off if they choose the integration model and not the existing model in family takaful.

References

- Billah, M. Ma'sum, 2003. *Islamic and Modern Insurance*. Selangor; Ilmiah Publishers.
- Fadzli, M.Y., 1996, The Concept and Operational System of Takaful Business. *New Horizon*, No. 5, May-June, pp: 10-13: 12-14.
- Muslehuddin, M., 1982, *Insurance and Islamic Law*. New Delhi: Islamic Research Institute.
- Muslehuddin, M., 2004, *Insurance and Islamic Law*. New Delhi: Adam Publisher & Distributors.
- Ghazali, P.L., 2010. Thesis Comparison of Mathematical Formulation in Life Insurance and Family Takaful. Kuala Terengganu: UMT, unpublished.
- Ghazali, P.L., I. Mohd, W.M.A.W. Ahmad and M. Mamat, 2011. Mathematical Modelling in Family takaful. *Journal of Applied Science*, 11: 3381- 3388.
- Ghazali, P.L., I. Mohd, W.M.A.W. Ahmad and M. Mamat, 2012. Integration Model of Education Plan Takaful: A Case Study for Terengganu, Kelantan and Perlis, States in Malaysia. *Far East Journal of Mathematical Sciences (FJMS)* 65(1): 97-117.
- Siddiq, M.N., 1980. *Muslim Economic Thinking*. Islamic foundation, Leicester UK, pp: 130.
- Syed, W.A., 1991, *Islamic Insurance in Malaysia*. In *Syed Khalid Rashid, Islamization of Insurance – A Religion-Legal experiment in Malaysia Religion and Law Review*, 2: 16.
- Yaquby, S.N., 2001. Possibilities of global uniformity amongst Takaful operators In light of the Shariah Norm. Speech International Summit on Takaful. Kuala Lumpur: Malaysian Institute of Insurance.
- Zainol, A., 2005, The Islamic Way of Insurance. *Contingencies January/February*, pp: 33-38.