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TABARRU' FUND SHARIA INSURANCE USING THE 2019 MORTALITY TABLE, MORTALITY LAW AND COST OF INSURANCE METHOD

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ABSTRACT

The sharia life insurance program has two ways of managing funds, namely involving a savings element and not involving a savings element. Programs that do not involve a savings element do not have a clear division of *tabarru'* funds that must be paid participant so it is the company's job to calculate it . In calculating the percentage of *tabarru'* funds used method Cost of Insurance (COI) . The COI method is method for calculating *tabarru'* funds with using several parameters, namely mortality tables , investment value (i), management fees (α) and discount factors (v). In this research, we will discuss how to obtain *tabarru'* funds using the 2019 Indonesian mortality table and the 2019 Indonesian mortality table with the Gompertz mortality law, Makeham mortality law and De Moivre mortality law. with method Cost of Insurance . Based on the case illustration, the results show that the *tabarru' funds* that must be paid by participants are directly proportional to the participant's age, management fees and insurance money, but inversely proportional to the investment value. *Tabarru'* funds will be greater if using the De Moivre mortality table so this can be a consideration for the company while the Makeham mortality table can be a consideration for participants.

Keywords: Cost of Insurance, De Moivre, Gompertz, Makeham, *Tabarru'* Fund

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PRELIMINARY

Not a few human problems in this world are related to mathematics, for example in the financial sector. Therefore creative thinking in dealing with human life problems, especially in the financial sector, is very important (Utari et al., 2023). One of the human problems in the financial sector is about insurance.

The insurance program in Indonesia itself is divided into two, namely conventional insurance and sharia insurance. With the majority of Indonesia's population being Muslim, this makes sharia insurance products increasingly developed, because sharia insurance

does not use an interest system in its calculation system, but uses a *mudharabah* or profit sharing system (Abdullah, 2018).

In the sharia insurance program, the premium paid by participants to the company consists of payment of savings contributions and contributions for *tabarru'* funds (Hafnisa 2022). *Tabarru'* funds are funds collected by insurance participants which are used for the benefit of fellow participants in the future if other participants experience a disaster (Ajib 2019). Contract used is contract *grants* (gifts) so that this *tabarru'* funds is right participant entirely and the company only is only the manager (Nurfatmasari et al., 2022).

The way of managing sharia life insurance is divided into two types, namely with a savings element and without a savings element (Saniy et al., 2022). In insurance with a savings element, the premium paid is both the savings contribution and the *tabarru'* fund contribution, whereas in insurance paid without the savings element, the premium paid is only the *tabarru'* contribution so there is no clear division regarding how much *tabarru'* funds are used paid by participants in premium payments each period (Fadilah 2019).

Several studies related to determining the amount of *tabarru'* funds have previously been carried out by Muzaki, et al on (Muzaki et al., 2020) who counts *tabarru'* funds using Makeham's mortality law and Gompertz's mortality law with Cost of Insurance method. Then similar research was carried out by Lianingsih, et al on (Lianingsih et al 2022) which calculates *tabarru'* funds using the 2019 Indonesian mortality table and the De Moivre's mortality law.

Based on the description above, the author is interested in researching matters related to adding a number of law mortality with title "*Tabarru'* Fund Sharia Insurance Using the 2019 Indonesian Mortality Table, Mortality Law and Cost of Insurance Method". With the aim of knowing how determine the amount of *tabarru'* funds that must be paid sharia life insurance participants without element savings, comparing mortality laws that are better used by companies and participants in determining the amount of *tabarru'* funds in an insurance system without a savings element and knowing the relationship between age, investment value, management fees, insurance money and the amount of *tabarru'* funds.

METHODS

The data used in this research is illustrative data male and female sharia life insurance participants aged 20, 30 and 50 years, investment values assumed of 2%, 5%, 10% and 15%, management fees assumed of 20% and 30%, sum insured assumed

amounting to IDR 50.000.000 and IDR 100.000.000 and the calculations were carried out using Microsoft Excel software.

A mortality table is a table containing a mathematical construction that completely describes the death rate and life probability of a group of people who are assumed to be born at the same time based on the age they have reached (Nor et al., 2018). The mortality table used as a basis for calculations is the 2019 Indonesian Mortality Table (TMI 2019) issued by the Indonesian Actuaries Association. Apart from using pure TMI 2019, it will used a number of law mortality as a Gompertz's mortality law, Makeham's mortality law and De Moivre's mortality law. Mortality law is a concept in statistics and insurance that describes the probability of death of a group of people within a certain age and certain period (Gasmara 2018). This mortality law will then be used to compile a mortality table.

Gompertz's mortality law was introduced by Benjamin Gompertz (1825) (Syifa 2019). Gompertz's mortality law is a distribution that is useful for describing the age at which a person will die based only on the age factor (Tai & Noymer 2018). Makeham's mortality law, which was first introduced by William M Makeham in 1860, is the result of a modification of Gompertz's mortality law (Jannah et al., 2020). Makeham's mortality law also uses other factors that cause death besides age. De Moivre's mortality law was introduced by De Moivre in 1725. De Moivre's mortality law has a smaller residual value than other mortality laws so it has a greater level of accuracy (Aprijon et al. 2019).

The Cost of Insurance (COI) method is methods in financial mathematics used in determining premium an insurance program, in this case the COI method can also be used in determining the amount of *tabarru'* funds in sharia life insurance. The COI method involves several parameters, namely the mortality table which includes gender, age and the individual's chance of dying at that age x (q_x), as well as other parameters, namely investment value (i), management fees (α) and discount factors (v) (Meyana et al. 2022). Calculating the percentage of *tabarru'* funds using the COI method uses the following formula (Atikasari et al.2023):

$$\boldsymbol{COI_x = \frac{vq_x}{1-\alpha} = \frac{\left(\frac{1}{1+i}\right)q_x}{1-\alpha}} \quad (1)$$

Following is a flow diagram this research :

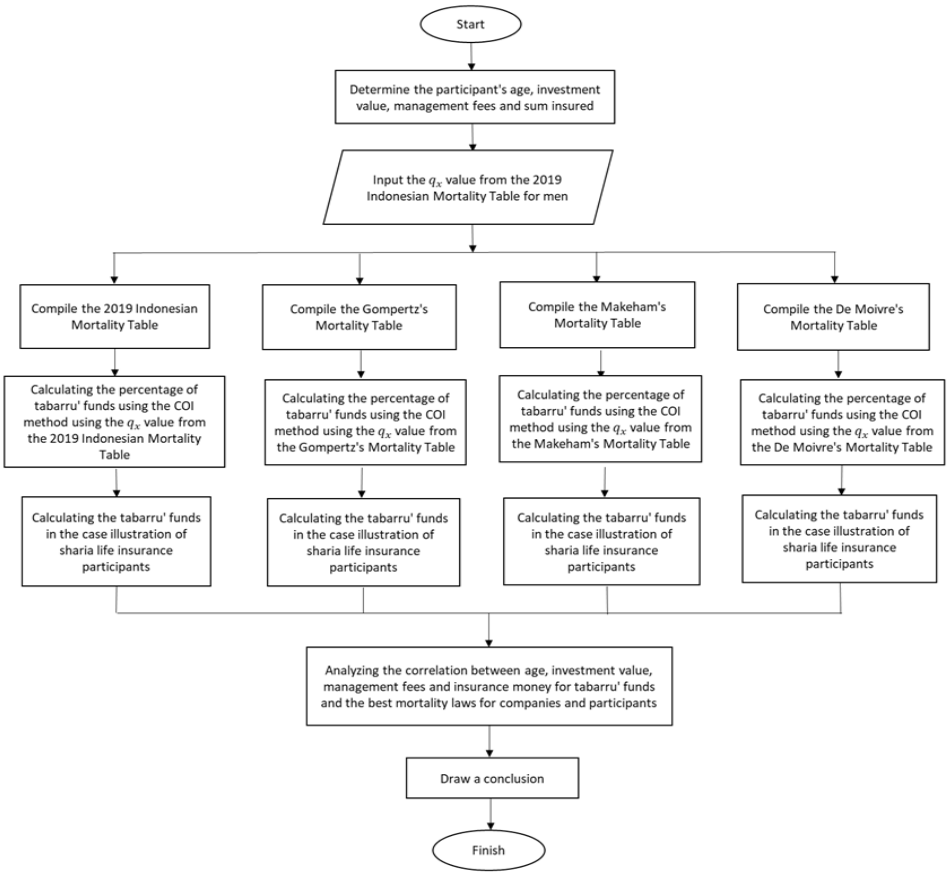

Figure 1. Research Flow

RESULTS AND DISCUSSION

Mortality Table

In table Indonesian mortality 2019 (TMI 2019) only there is person's age (x) and the probability of an individual dying at that age x (q_x) while for the chances of individuals still surviving at age x (p_x) can calculated with use formula following (Ramadhan 2018):

$$\boldsymbol{p_x = \frac{l_{x+1}}{l_x}} \text{ or } \boldsymbol{p_x = 1 - q_x} \quad (2)$$

In Gompertz's mortality law there are two parameters, namely parameters B that describe the death rate and parameters c that describe the death growth rate (Putra 2019). To be able to compile the Gompertz mortality table, several formulas are needed as follows (Meyana et al., 2022):

$$\boldsymbol{p_x = exp\left[-\frac{Bc^x}{ln\, c}(c-1)\right]} \quad (3)$$

$$\boldsymbol{q_x = 1 - exp\left[-\frac{Bc^x}{ln\, c}(c-1)\right]} \quad (4)$$

This research will use the Ordinary Least Square (OLS) method in calculating parameters B and c. This method is used by minimizing the sum of squared errors. The following is the regression equation obtained from Gompertz's mortality law:

$$ln\left(ln\left(\frac{1}{(1-q_x)}\right)\right) = x\,ln\,c + ln\left(\frac{B}{ln\,c}(c-1)\right) \quad (5)$$

By using Microsoft Excel, the parameters $B = 0{,}000105$ and $c = 1{,}080109$ for male and $B = 0{,}0000770329$ and $c = 1{,}080004$ for female were obtained.

In Makeham's mortality law, factors cause death besides age such as an accident or a certain disease is called a parameter A. To be able to compile the Makeham mortality table, several formulas are needed as follows (Putra 2019):

$$p_x = exp\left(-A - \frac{Bc^x}{ln\,c}(c-1)\right) \quad (6)$$

$$q_x = 1 - exp\left[-A - \frac{Bc^x}{ln\,c}(c-1)\right] \quad (7)$$

In this study, the Makeham mortality law parameter values obtained from previous research will be used (Dira, et al., 2022) who obtained this parameter value using the Non-Linear Least Square (NLS) method, namely parameters A = 0,00093, B = 0,0000082, c = 1,115 for male and A = 0,00055, B = 0,0000076, c = 1,112 for female.

In De Moivre's mortality law, the maximum age a person can survive is required, this can be denoted by ω. To be able to compile the De Moivre mortality table, several formulas are required as follows (Jannah et al. 2020):

$$p_x = \frac{\omega - x - t}{\omega - x} \; atau \; p_x = 1 - q_x \quad (8)$$

$$q_x = \frac{1}{\omega - x - t} \quad (9)$$

Based on the results of the description above, a mortality table is obtained which will be used in the calculations presented in the following table.

Table 1. 2019 Indonesian Mortality Table and Gompertz's Mortality Table

Age (x)	2019 Indonesian Mortality Table				Gompertz's Mortality Table			
	Male		Female		Male		Female	
	q_x	p_x	q_x	p_x	q_x	p_x	q_x	p_x
0	0,00524	0,99476	0,002266	0,99734	0,00010907	0,999890926	8,0072E-05	0,9999199
1	0,00053	0,99947	0,00041	0,99959	0,00011781	0,999882189	8,6477E-05	0,9999135
2	0,00042	0,99958	0,00031	0,99969	0,00012725	0,999872752	9,3396E-05	0,9999066
3	0,00034	0,99966	0,00024	0,99976	0,00012744	0,999862559	0,00010087	0,9998991
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
110	0,59244	0,40756	0,58702	0,41298	0,4077371	0,592262897	0,31643282	0,6835672
111	1,0000	0	1,000	0	0,43207507	0,567924932	0,33692435	0,6630757

Table 2. Makeham's Mortality Table and De Moivre's Mortality Table

Age (x)	Makeham's Mortality Table				De Moivre's Mortality Table			
	Male		Female		Male		Female	
	q_x	p_x	q_x	p_x	q_x	p_x	q_x	p_x
0	0,00093822	0,99906178	0,00055786	0,99944214	0,00900901	0,99099099	0,00900901	0,99099099
1	0,00093922	0,99906078	0,00055876	0,99944124	0,00909091	0,99090909	0,00909091	0,99090909
2	0,00094033	0,99905967	0,00055976	0,99944024	0,00917431	0,99082569	0,00917431	0,99082569
3	0,00094156	0,99905844	0,00056087	0,99943913	0,00925926	0,99074074	0,00925926	0,99074074
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
110	0,7470742	0,2529258	0,61167336	0,38832664	1	0	1	0
111	0,78403479	0,21596521	0,65068758	0,34931242	Undefined	Undefined	Undefined	Undefined

Tabarru' Funds Precentage

Before calculating how much *tabarru'* funds must be paid participant to company every period, company moreover first you have you calculate percentage of *tabarru'* funds by using tables mortality and COI method. This percentage of *tabarru'* funds is the amount of *tabarru'* funds in the form of percentage with assumed sum assured participant equal to 1.

a. Precentage of *Tabarru'* Funds Using The 2019 Indonesian Mortality Table

Probability value of an individual dying at age x (q_x) required using table 1 as well as calculating the percentage of *tabarru'* funds calculated with use the formula contained in equation (1) . Calculation results summarized in table 3.

Table 3. Precentage of *Tabarru'* Funds TMI 2019

Age (x)	Management Fee 20%								Management Fee 30%							
	Investment Value (i)								Investment Value (i)							
	2%		5%		10%		15%		2%		5%		10%		15%	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0	0,00642	0,00326	0,00624	0,00317	0,00595	0,00302	0,0057	0,00289	0,00734	0,00373	0,00713	0,00362	0,00681	0,00345	0,00651	0,0033
1	0,00065	0,0005	0,00063	0,00049	0,0006	0,00047	0,00058	0,00045	0,00074	0,00057	0,00072	0,00056	0,00069	0,00053	0,00066	0,00051
2	0,00051	0,00038	0,0005	0,00037	0,00048	0,00035	0,00046	0,00034	0,00059	0,00043	0,00057	0,00042	0,00055	0,0004	0,00052	0,00039
3	0,00042	0,00029	0,0004	0,00029	0,00039	0,00027	0,00026	0,00026	0,00048	0,00034	0,00046	0,00033	0,00044	0,00031	0,00042	0,0003
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
110	0,72603	0,71939	0,70529	0,69888	0,67323	0,66707	0,64396	0,63807	0,82216	0,82216	0,80604	0,79867	0,7694	0,76236	0,73595	0,72922
111	1,22549	1,22549	1,19048	1,19048	1,13636	1,13636	1,08696	1,08696	1,40056	1,40056	1,36054	1,36054	1,2987	1,2987	1,24224	1,24224

b. Precentage of *Tabarru'* Funds Using Gompertz's Mortality Table

Probability value of an individual dying at age x (q_x) required can use table 1. The calculation results are summarized in table 4.

Table 4. Precentage of *Tabarru'* Funds Gompertz's Mortality Table

Age (x)	Management Fee 20%								Management Fee 30%							
	Investment Value (i)								Investment Value (i)							
	2%		5%		10%		15%		2%		5%		10%		15%	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0	0,00013	9,8E-05	0,00013	9,5E-05	0,00012	9,1E-05	0,00012	8,7E-05	0,00015	0,00011	0,00015	0,00011	0,00014	0,0001	0,00014	9,9E-05
1	0,00014	0,00011	0,00014	0,0001	0,00013	9,8E-05	0,00013	9,4E-05	0,00017	0,00012	0,00016	0,00012	0,00015	0,00011	0,00015	0,00011
2	0,00016	0,00011	0,00015	0,00011	0,00014	0,00011	0,00014	0,0001	0,00018	0,00013	0,00017	0,00013	0,00017	0,00012	0,00016	0,00012
3	0,00017	0,00012	0,00016	0,00012	0,00016	0,00011	0,00015	0,00011	0,00019	0,00014	0,00014	0,00014	0,00018	0,00013	0,00017	0,00013
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
110	0,49968	0,38779	0,4854	0,37671	0,46334	0,35958	0,44319	0,34395	0,57106	0,44318	0,43052	0,43052	0,52963	0,41095	0,59651	0,39308
111	0,5295	0,4129	0,51438	0,4011	0,49099	0,38287	0,46965	0,36622	0,60515	0,47188	0,4584	0,4584	0,56114	0,43756	0,53674	0,41854

c. Precentage of *Tabarru'* Funds Using Makeham's Mortality Table

Probability value of an individual dying at age x (q_x) required can use table 2. The calculation results are summarized in table 5.

Table 5. Precentage of *Tabarru'* Funds Makeham's Mortality Table

Age (x)	Management Fee 20%								Management Fee 30%							
	Investment Value (i)								Investment Value (i)							
	2%		5%		10%		15%		2%		5%		10%		15%	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0	0,00115	0,00068	0,00112	0,00066	0,00107	0,00063	0,00102	0,0006	0,00131	0,00078	0,00128	0,00076	0,00122	0,00072	0,00117	0,00069
1	0,00115	0,00068	0,00112	0,00067	0,00107	0,00063	0,00102	0,0006	0,00132	0,00078	0,00128	0,00076	0,00122	0,00073	0,00117	0,00069
2	0,00115	0,00069	0,00112	0,00067	0,00107	0,00064	0,00102	0,0006	0,00132	0,00078	0,00128	0,00076	0,00122	0,00073	0,00117	0,0007
3	0,00115	0,00069	0,00112	0,00067	0,00107	0,00064	0,00102	0,0006	0,00132	0,00079	0,00128	0,00076	0,00122	0,00073	0,00117	0,0007
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
110	0,91553	0,7496	0,88937	0,72818	0,84895	0,69508	0,81204	0,6649	1,04632	0,85669	1,01643	0,83221	0,97023	0,79438	0,92804	0,75984
111	0,96083	0,79741	0,93337	0,77463	0,89095	0,73942	0,85221	0,7073	1,09809	0,91133	1,06671	1,01823	1,01823	0,84505	0,97396	0,80831

d. Precentage of *Tabarru'* Funds Using De Moivre's Mortality Table

Probability value of an individual dying at age x (q_x) required can use table 2. The calculation results are summarized in table 6.

Table 6. Precentage of *Tabarru'* Funds De Moivre's Mortality Table

Age (x)	Management Fee 20%								Management Fee 30%							
	Investment Value (i)								Investment Value (i)							
	2%		5%		10%		15%		2%		5%		10%		15%	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0	0,01104	0,01104	0,01073	0,01073	0,01024	0,01024	0,00979	0,00979	0,01262	0,01226	0,01226	0,01226	0,0117	0,0117	0,01119	0,01119
1	0,01114	0,1114	0,01082	0,01082	0,01033	0,01033	0,00988	0,00988	0,01273	0,01273	0,01237	0,01237	0,01181	0,01181	0,01129	0,01129
2	0,01124	0,1124	0,01092	0,01092	0,01043	0,01043	0,00997	0,00997	0,01285	0,01285	0,01248	0,01248	0,01191	0,01191	0,0114	0,0114
3	0,01135	0,01135	0,01102	0,01102	0,01052	0,01052	0,01006	0,01006	0,01297	0,01297	0,0126	0,0126	0,01203	0,01203	0,0115	0,0115
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
110	1,22549	1,22549	1,19048	1,19048	1,13636	1,13636	1,08696	1,08696	1,40056	1,40056	1,36054	1,36054	1,2987	1,2987	1,24224	1,24224
111	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined

Calculations of Tabarru' Funds In The Case Illustration of Sharia Life Insurance Participants

Tabarru' funds can be done by multiplying the value COI_x in each mortality table by the insurance participant's sum assured. This time the calculation will only use male participants, while female participants can be searched using a method similar to the previously calculated mortality table.

a. Calculations using the 2019 Indonesian mortality table

Table 7. Calculations Using TMI 2019

Age (x)	Sum Insured Rp 50.000.000								Sum Insured Rp 100.000.000							
	Management Fee 20%				Management Fee 30%				Management Fee 20%				Management Fee 30%			
	Investment Value (i)				Investment Value (i)				Investment Value (i)				Investment Value (i)			
	2%	5%	10%	15%	2%	5%	10%	15%	2%	5%	10%	15%	2%	5%	10%	15%
20	30024,51	29166,67	27840,91	26630,43	34313,73	33333,33	31818,18	30434,78	60049,02	58333,33	55681,82	53260,87	68627,45	66666,67	63636,36	60869,57
30	45955,88	44642,86	42613,64	40760,87	52521,01	51020,41	48701,3	46583,85	91911,76	89285,71	85227,27	81521,74	105042	102040,8	97402,6	93167,7
50	311274,5	302381	288636,4	276087	355742,3	345578,2	329870,1	315528	622549	604761,9	577272,7	552173,9	711484,6	691156,5	659740,3	631055,9

b. Calculations using the Gompertz's Mortality Table

Table 8. Calculations Using Gompertz's Mortality Table

Age (x)	Sum Insured Rp 50.000.000								Sum Insured Rp 100.000.000							
	Management Fee 20%				Management Fee 30%				Management Fee 20%				Management Fee 30%			
	Investment Value (i)				Investment Value (i)				Investment Value (i)				Investment Value (i)			
	2%	5%	10%	15%	2%	5%	10%	15%	2%	5%	10%	15%	2%	5%	10%	15%
20	31207,76	30316,11	28938,1	27679,93	35666,01	34646,98	33072,12	31634,2	62415,52	60632,22	57876,21	55359,85	71332,02	69293,96	66144,24	63268,4
30	67423,19	65496,81	62519,68	59801,44	77055,07	74853,5	71451,07	68344,5	134846,4	130993,6	125039,4	119602,9	154110,1	149707	142902,1	136689
50	314255,2	305276,5	291400,3	278730,7	359148,8	348887,4	333028,9	318549,4	628510,4	610553	582800,6	557461,4	718297,6	697774,8	666057,8	637098,8

c. Calculations using the Makeham's Mortality Table

Table 9. Calculations Using Makeham's Mortality Table

Age (x)	Sum Insured Rp 50.000.000								Sum Insured Rp 100.000.000							
	Management Fee 20%				Management Fee 30%				Management Fee 20%				Management Fee 30%			
	Investment Value (i)				Investment Value (i)				Investment Value (i)				Investment Value (i)			
	2%	5%	10%	15%	2%	5%	10%	15%	2%	5%	10%	15%	2%	5%	10%	15%
20	61636,4	59875,36	57153,75	54668,8	70441,6	68428,98	65318,57	62478,63	123272,8	119750,7	114307,5	109337,6	140883,2	136858	130637,1	124957,3
30	70849,96	68825,68	65697,24	62840,83	80971,38	78657,91	75082,55	71818,1	141699,9	137651,4	131394,5	125681,7	161942,8	157315,8	150165,1	143636,2
50	179378,2	174253,2	166332,6	159100,7	205003,7	199146,5	190094,4	181829,4	358756,5	348506,3	332665,1	318201,4	410007,4	398292,9	380188,7	363658,8

d. Calculations using the De Moivre's Mortality Table

Table 10. Calculations Using De Moivre's Mortality Table

Age (x)	Sum Insured Rp 50.000.000								Sum Insured Rp 100.000.000							
	Management Fee 20%				Management Fee 30%				Management Fee 20%				Management Fee 30%			
	Investment Value (i)				Investment Value (i)				Investment Value (i)				Investment Value (i)			
	2%	5%	10%	15%	2%	5%	10%	15%	2%	5%	10%	15%	2%	5%	10%	15%
20	680827,9	661375,7	631313,1	603864,7	769538,6	747551,8	713572,1	682547,3	1346693	1308216	1248751	1194458	1539077	1495104	1427144	1365095
30	756475,4	734861,8	701459	670960,8	864543,3	839842,1	801667,5	766812,4	1512951	1469724	1402918	1341922	1729087	1679684	1603335	1533625
50	1004500	975800,2	931445,6	890948	1148000	1115200	1064509	1018226	2009000	1951600	1862891	1781896	2296000	2230400	2129019	2036452

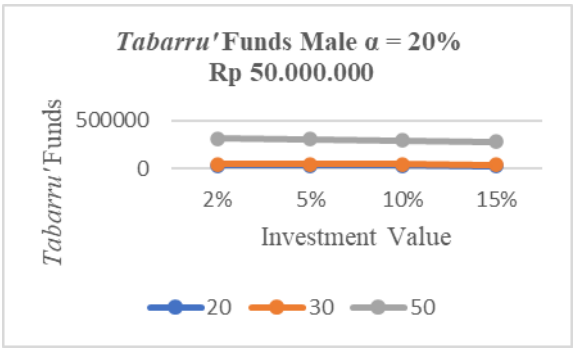

Figure 2. *Tabarru'* Funds Male α=20% Rp50.000.000

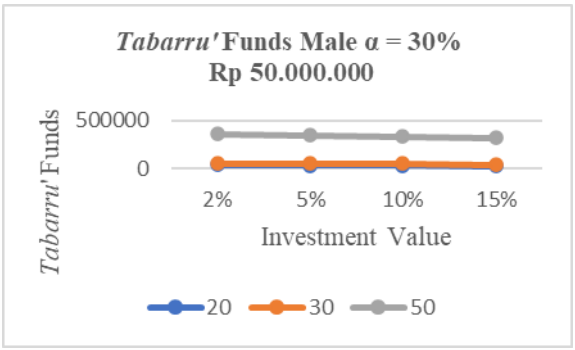

Figure 3. *Tabarru'* Funds Male α=30% Rp50.000.000

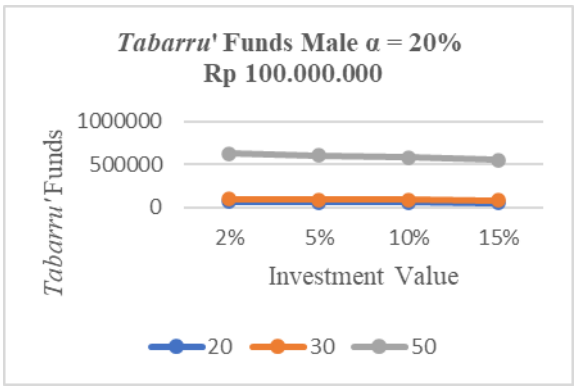

Figure 4. *Tabarru'* Funds Male α=20% Rp 100.000.000

Based on the calculation results illustration cases in table 7 to table 10 and illustrative graphs the cases in figure 2 to figure 4 are obtained that the amount of *tabarru'* funds that must be paid by participants each period is directly proportional to age, management fees and the sum insured, but inversely proportional to the investment value . This is in accordance with the results of research by (Indriani & Sari, 2020) and (Hidayat et al., 2019) who obtained similar research results .

Figure 5 shows an illustration of *tabarru'* funds male participants aged 20, 30 and 50 years, investment value of 2%, management fee of 20% and insurance sum IDR 50.000.000.

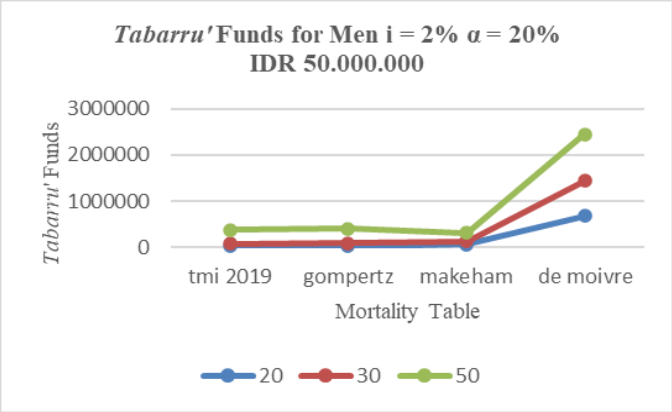

Figure 5**. Illustration of Male Participants**

Based on figure 5, it is obtained that calculation *tabarru'* funds use the De Moivre mortality table own mark biggest while using Makeham mortality table own mark smallest. Similar conclusions were also obtained if you use illustrations case participant male nor female, as well various investment rate, various management fees and various insurance sums.

CONCLUSION

Calculation of *tabarru'* funds for sharia life insurance participants without savings element using the 2019 Indonesian mortality table, Gompertz mortality table, Makeham mortality table and De Moivre mortality table can be calculated by using the *Cost of Insurance* method. Based on the results obtained from illustration case sharia life insurance participants are obtained that the amount of the *tabarru'* funds increases with the age of the participants, the sum insured and management fees. However, it gets smaller if the investment value used gets bigger. *Tabarru'* funds biggest obtained using the De Moivre mortality table and *tabarru'* funds smallest obtained using the Makeham mortality table. Therefore, it is recommended that companies use the De Moivre mortality table in calculating the amount of *tabarru'* funds. Meanwhile, participants are advised to choose an insurance program that calculates *tabarru'* funds using the Makeham mortality table.

In science mathematics and statistics there is lots law mortality besides law Gompertz's mortality law, Makeham's mortality law and De Moivre's mortality law is like Weibull mortality law, Cairns-Blake-Dowd (CBD) mortality law and Lee Carter's mortality law. Expected in research you can add later law mortality the as comparison.

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