PUBLIC HEALTH RESEARCH

Prevalence of 'Researcher's defined' and 'Self-rated' Successful Aging among Pre-Retirement Public Servants

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ABSTRACT

Introduction The socioeconomic impact of aging population can be reduced if majority of people achieve successful aging (SA). SA is having good health along with opportunities for participation and security as people age. This study aimed to determine the prevalence of researcher's defined successful aging (RDSA) and self-rated successful aging (SRSA) among pre-retirement public servants and their predictors.

Methods The sample included 1,064 pre-retirement public servants (50 to 60 years old) from nine government agencies. Data was analyzed using Multiple Logistic Regression to test for the association between the studied factors and SA. Foreigner and those on long medical leave were excluded from this study.

Results The prevalence of RDSA and SRSA was 37.5% and 98.7%, respectively. Results showed four (4) significant factors with higher odds of having RDSA were not obese, good social support, being physically active and younger age. Meanwhile, five (5) factors highly selected by respondents as predictors for SRSA were having good spiritual or religious practice, happy family, good psycho cognitive function, social support and good physical function.

Conclusions The prevalence of SRSA was higher despite the presence of self-reported chronic diseases and physical limitation among respondents. The discrepancy in both prevalence of SA reflects the differences that exist between the criteria for SA perceived by respondents and researchers. Misperception among respondents of their aging process as 'successful' despite having disease may worsen their health status because they continue practicing unhealthy lifestyles without action to improve it. Promotional activities on SA, regular health screening since young and healthy working environment should be implemented by various agencies.

Keywords Successful aging - pre-retirement - public servants - predictors.

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INTRODUCTION

One of the consequences of aging population is that it can lead to increase in the socio-economic burden of a country. Since Malaysia is projected to reach aging population by year 2020,[1] it is really important to ensure that a high proportion, if not all older adult aged successfully in order to reduce the impact of aging population. Successful aging (SA) is a term that is always used interchangeably with 'active aging' had or 'healthy aging'. The possibility of someone to enter the long-term care institution during their old days can be reduced if SA is achieved. [2] In fact, the risk of all-cause mortality is lower among successful agers compared to those who did not have SA.[3]

Based on previous studies, the main theoretical themes for SA comprised of biomedical theories, psychosocial theories or combination of both theories. For biomedical theories, the concept was made popularized by Rowe and Kahn whereby their model comprised of three main criteria which were no major diseases, having good physical functioning as well as having good psycho-cognitive functioning.[4] In psychosocial theories, the domains of SA may include psychological resources, life satisfaction, personal growth and learning new things, social involvement, functioning and network and spiritual or religious practices.

Meanwhile, some researchers believed that the definition of SA should not only involve the objective judgement made by researchers on the older adult but must also include the subjective aspect which taken into account the perception of the older adult. Objective definitions set by researchers tend to emphasize on halting deterioration among older adult, whereas in terms of expressing processes, goals, one's attitudes, social milestones and connectedness it is best explained by subjective definitions.[5]

This study aimed to determine the prevalence of researcher's defined SA (RDSA) and the prevalence of self-rated SA (SRSA) among pre-retirement age group public servants in Malaysia. Following that, the predictors of SA were compared between the two groups. It is hoped that the information from this study could contribute public health sector in planning for intervention strategies specifically for pre-retirement age population to prepare them for a better future and improving the pre-existing health care services to meet the increasing demands from the aging adults.

Prevalence and predictors of SA

Since this study was carried out with reference Rowe and Kahn's model, some examples on the prevalence of SA from previous studies that applied similar model were noted to be as low as 25.4% [6] and even higher at 50% or more.[7] The difference in the findings between studies could be due to various reasons such as influences from the culture, difference between age groups and difference between study populations or focused groups.[7] Factors that were commonly studied for the predictors of SA include midlife behavioural risk factors, physical functioning, social engagement, daily activities, cognitive functions, spiritual aspects[8] and genetics or hereditary. [9]

METHODS

Study sample

This cross-sectional study was conducted from July until December 2019 and involved 1,064 pre-retirement aged group (aged 50 - 60 years) public servants working at nine government agencies within the Kuala Lumpur Federal Territory and Selangor, Malaysia. Multistage sampling was applied, whereby simple random sampling was used for selecting five of 23 available ministries and subsequently for selecting the agencies to represent each ministry. Subjects were also selected using simple random sampling.

The subjects were required to complete a self-administered questionnaire and their cognitive function was assessed using the Mini-Mental State Examination (MMSE). Some questions from previous studies had undergone translation from the original English into Malay, pre-testing, validity and reliability testing prior to usage. Cronbach's alpha minimum acceptable value was 0.7. Factor loadings for all the items were >0.4.

Measures

Dependent variables

i. Researcher's Defined SA (RDSA)

Two dependent variables involved in this study. This first dependent variable was operationalised based the Rowe and Kahn's model (1987). Subjects were categorized as having RSDA only if they fulfilled all three criteria: 1) no major chronic disease (self-reported did not have any of six (6) diseases i.e. diabetes mellitus, hypertension, stroke, chronic lung diseases, cancer and heart problem), 2) having good physical functioning, and 3) good psycho-cognitive functioning.

For the physical function assessment, subjects rated their difficulty in performing nine physical tasks without using supportive equipment: walking 400 meters (1/4 mile); walking up 10 steps without resting (climbing) and standing for 2 hours; sitting for 2 hours; bending, bowing or kneeling; reaching or reaching something above the head; using fingers to hold or handle small objects; lifting or carrying an object weighing 4.5 kg; and pushing or pulling large objects. Rating scale were unable to do it directly, very difficult, quite difficult, slightly difficult and not difficult at all. Those who answered not difficult at all, slight difficulty or quite difficult

were categorized as having good physical function [10].

Psychological function was assessed using the Malay version 21-item Depression Anxiety Stress Scale (DASS-21) questionnaire and scoring. Those with score results under normal and mild categories were deemed to have good psychological function. Meanwhile, MMSE scores of ≥ 23 indicate good cognitive function [11].

ii. Self-rated SA (SRSA)

For this second dependent variable, subjects rated their own degree of SA on a scale from one (least successful) to 10 (most successful). Then, they were required to answer using 4-points Likert scale to evaluate their agreement on a statement "I am aging well" (1 = definitely false, 2 = mostly false, 3 = mostly true, 4 = definitely true). Those who answered "definitely true" or "mostly true" to the statement was considered as having SRSA [12].

Predictors

Socio-demographic factors included age, ethnic, gender, marital status, having children, educational level, employment status, job category, retirement scheme and monthly individual income. The behavioural variables were smoking status, alcohol consumption, substance usage in the last 12 months, physical activity, daily consumption of fruits and vegetables and body weight. The body mass index (BMI) was calculated as weight (kg)/height squared (m^2). Those who exercised at least 150 minutes/week (moderate intensity such as 30 minutes brisk walking at least five times/week) were categorized as physically active [13].

Social support was assessed using the 8-item Duke-UNC Functional Social Support Questionnaire with a 5-point Likert scale (ranging from 1 = much less than I would like, to 5 = as much as I would like). Those who scored >30 were considered to have good social support [14].

Subjects who answered 'yes' to at least one of the 11 items related to the cost of treatment, transportation problem, cost of transport, inadequate drugs or equipment at health facilities, inadequate health personnel skills, was badly treated by health personnel, having other personal commitments or work, not knowing where to go, thinking they were 'not sick enough', and denial of healthcare were categorized as having barriers to healthcare [13].

Pre-retirement preparation were assessed based on subject's agreement with the statement 'I am well prepared for retirement' using a 4-point Likert scale (definitely false, mostly false, mostly true and definitely true). Those who answered definitely true or mostly true were considered to have pre-retirement preparation.

Data Analysis

Pearson's Chi-Square test and Yates correction test (for certain variables) were used in bivariate analysis. For multivariate analysis, the Multiple Logistic Regression was used. The level of statistical significance for this study was p-value <0.05.

All pre-retirement age public servants whether permanent or contract basis working statuses were included in this study. Foreigner, those on long medical leave and Ministry of Health employees were excluded from this study.

RESULTS

Respondents' Characteristic

Table 1 shows the characteristics of the subjects. This study enrolled 1,064 subjects with a mean age of 53.60 ± 2.7 years (50-60 years), 72.9% of them were women. The majority subjects were married (90.9%), Malay (78.7%), aged 50–54 years old (64.5%), professional (74.2%) with bachelor degree qualification (55.4%) and had monthly income of RM 5,600.00 and above (634, 59.6%). The mean monthly gross income was RM 6,166.75 ± RM 2,324.12.

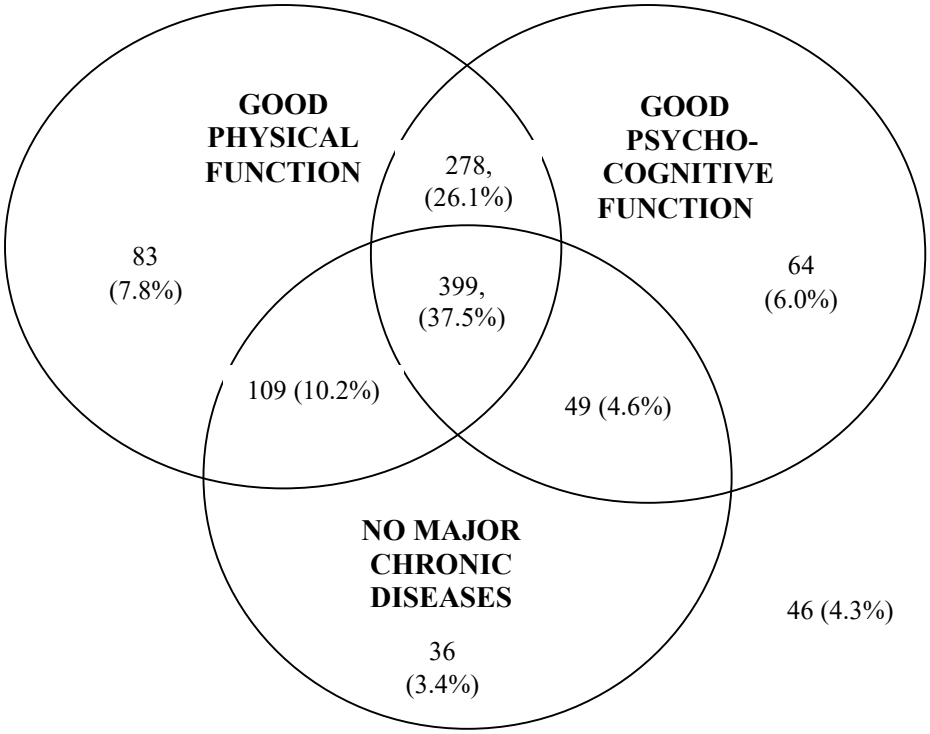
For the behavioural aspect, many of them had inadequate daily fruits and vegetables intake and physically inactive. 41.1% of the subjects were overweight. Most of the subjects were non-smoker and non-alcohol user. Having good social support was perceived by 813 subjects (76.4%). Almost all subjects claimed to have pre-retirement preparation (1,024, 96.2%) and only 57 subjects (5.4%) had ever experienced barriers in obtaining healthcare.

Table 1 Characteristics of subjects according to socio-demographic and other studied factors (n= 1,064)

Variable	n	%	Mean	S.D
Age (year)			53.60	2.7
50 to 54 years old	686	64.5		
55 to 60 years old	378	35.5		
Gender				
Male	288	27.1		
Female	776	72.9		
Ethnic				
Malay	837	78.7		

Chinese	95	8.9		
Indian	123	11.6		
Others	9	0.8		
Marital status				
Single/Never married	38	3.6		
Married	967	90.9		
Separated	4	0.4		
Divorcee	22	2.1		
Widower	33	3.1		
Having children				
Yes	1009	94.8		
No	41	3.9		
Educational level				
Completed form 3	34	3.2		
Completed form 5	135	12.7		
Completed form 6/certificate/diploma	167	15.7		
Completed a bachelor degree	589	55.4		
Completed a master degree	124	11.7		
Completed a doctoral qualification (PhD)	6	0.6		
Others	9	0.8		
Job category				
Professionals	790	74.2		
Support staffs	274	25.8		
Employment status				
Permanent	1,061	99.7		
Contract	3	0.3		
Monthly individual's income (RM)			6,166.75	2,324.12
< RM 2,300.00	38	3.6		
RM 2,300.00 - RM5,599.00	392	36.8		
≥ RM5,600.00	634	59.6		
Median (IQR)			6,000 (5,000, 7,500)	
Min – Max			800 - 21,677.00	
Retirement scheme				
Pension	1,024	96.2		
Employees Provident Fund (EPF)	40	3.8		
Body Mass Index (BMI)				
< 18.5 (underweight)	23	2.2		
18.50 – 24.99 (normal)	385	36.2		
25.00 – 29.99 (overweight)	437	41.1		
> 30.00 (obese)	216	20.3		
Smoking Status				
Yes	69	6.5		
No	754	70.9		
Alcohol drinking				
Yes	55	5.2		
No	1,009	94.8		
Physically active				
Yes	286	26.9		
No	778	73.1		
Adequate daily consumption of fruits and vegetables				
Yes	237	22.3		
No	827	77.7		
Perceived social support			33.53	5.65
Good social support (score > 30)	813	76.4		
Poor social support (score ≤ 30)	251	23.6		

In terms of the criteria of RDSA, 471 (44.3%) had at least one of the six major chronic diseases; most had hypertension (360, 33.8%), followed by diabetes mellitus (209, 19.6%) and heart disease (42, 3.9%). Of the subjects, only 36 (3.4%) did not have major chronic disease, 869 (81.7%) had good physical function and 790 (74.2%) had good psycho-cognitive function (whereby 100% of subjects had good cognitive function (mean MMSE score, 25.00 ± 0.92; range, 23-25)). Overall, 399 subjects met the all three criteria for SA, thus the prevalence of RDSA was 37.5% (Figure 1).



Note: No. of respondents, n = 83 + 278 + 399 + 109 +64 + 49 +36+46 = 1,064

Figure 1 Distribution of the frequency and percentage of respondents according to theRDSA criteria fulfilled (n=1,064)

Meanwhile, the prevalence of SRSA was 98.7% (1,050). For the SRSA, subjects had rated their own degree of SA on a scale from one (least successful) to 10 (most successful). The mean score for this question was 7.67 ± 1.29. Majority of the subjects rated their aging at the scale of 8 (41.4%), followed by 7 (20.6%) and 9 (14.7%). Ten subjects rated at the scale of less than 5 (1.0%). Only 74 subjects (7.0%) rated themselves as most successful (scale 10). Factors that were perceived by subjects as predictors for SA (SRSA) as listed in Table 2.

Table 2 Frequency and percentage distribution of subjects according to the factors perceived and selected by them as predictors for SA (SRSA) (n=1,064)

Factors selected by subjects as predictors for SA	n	%
Not having major disease	906	85.15
Good Physical functioning	980	92.11
Good Psycho cognitive functioning	1,004	94.36
Married	840	78.95
Owned house	966	90.79
High Educational level	667	62.69
Permanent employment status	894	84.02
Professional (Work category)	613	57.61
High monthly household income	660	62.03
Good spiritual/religious practice	1,026	96.43
Not Smoking	890	83.65

Not drinking alcohol	893	83.93
Not using substance/drug usage	906	85.15
Physically active	864	81.20
Daily consumption of fruits and vegetables	928	87.22
Normal body weight status	876	82.33
Having good social support	1,003	94.27
No barrier to get health care	961	90.32
Having pre-retirement preparation	948	89.10
i) Have financial support/savings to be used once retired, allocated for		
a. daily usage	973	91.45
b. health/medication	922	86.65
c. religious/spiritual practices (eg. for Hajj or pilgrims)	952	89.47
d. vacation	810	76.13
ii) Insurance coverage	776	72.93
iii) Shares/investment	556	52.26
v) Properties		
a. Land/farm	585	54.98
b. Own transport/vehicle, eg. car	935	87.88
Success in career	857	80.55
Self-achievement	838	78.76
Having a happy family	1,016	95.49
Having successful children	965	90.70
Having many friend	901	84.68
No debt with any banking or other sources	812	76.32
Others	40	3.76

Bivariate Analysis

Table 3 shows the results of bivariate analysis to determine factors associated with RDSA and SRSA. There were four (4) factors significantly associated with RDSA. Non-obese (χ^2 = 19.43, p< 0.01), younger group (χ^2 = 4.34, p = 0.04) and physically active (χ^2 = 6.43, p = 0.01) subjects experienced significantly more RDSA than their counterparts. Subjects with good social support (χ^2=12.95, p<0.01) had significantly lower risk of becoming non-successful agers. There was no significant difference for the other variables between subjects with or without RDSA. Similar analysis was also carried out to determine factors associated with SRSA. However, none of the studied factor showed association with SRSA.

Table 3 Prevalence and statistical analysis for RDSA and SRSA according to the studied factors using Chi-square test and Yates correction (n=1,064)

Factor	Researcher's defined successful aging (RDSA)		x² value (df)	p value	Self rated successful aging (SRSA)		x² value (df)	p value
	Yes n (%)	No n (%)			Yes n (%)	No n (%)		
Age (year)								
50 to 54 years old	273 (39.8)	413 (60.2)	4.34	0.04	676 (98.5)	10 (1.5)	0.07*	0.79
55 to 60 years old	126 (33.3)	252 (66.7)	(1)		374 (98.9)	4 (1.1)	(1)	
Ethnic								
Bumiputera	325 (38.4)	521 (61.6)	1.48	0.22	834 (98.6)	12 (1.4)	0.06	0.81
Non bumiputera	74 (33.9)	144 (66.1)	(1)		216 (99.1)	2 (0.9)	(1)	
Gender								
Male	103 (35.8)	185 (64.2)	0.51	0.48	282 (97.9)	6 (2.1)	1.79	0.18
Female	296 (38.1)	480 (61.9)	(1)		768 (99.0)	8 (1.0)	(1)	
Marital status								
In relationship	366 (37.8)	601 (62.2)	0.55	0.46	955 (98.8)	12 (1.2)	0.04*	0.83
Not in relationship	33 (34.0)	64 (66.0)	(1)		95 (97.9)	2 (2.1)	(1)	
Having children								
Yes	372 (36.9)	637 (63.1)	0.08	0.78	997 (98.8)	12 (1.2)	1.75*	0.19
No	16 (39.0)	25 (61.0)	(1)		39 (95.1)	2 (4.9)	(1)	
Highest educational level								

High	272 (37.8)	447 (62.2)	0.10	0.75	708 (98.5)	11 (1.5)	0.36*	0.55
Low	127 (36.8)	218 (63.2)	(1)		342 (99.1)	3 (0.9)	(1)	
Employment status								
Permanent	398 (37.5)	663 (62.5)	0.00*	1.00*	1,047 (98.7)	14 (1.3)	0.00*	1.00
Contract	1 (33.3)	2 (66.7)	(1)		3 (100.0)	0 (0.0)	(1)	
Job category								
Professionals	298 (37.7)	492 (62.3)	0.06	0.80	779 (98.6)	11 (1.4)	0.00*	0.95
Support staffs	101 (36.9)	173 (63.1)	(1)		271 (98.9)	3 (1.1)	(1)	
Retirement scheme								
Pension	388 (37.9)	636 (62.1)	1.77	0.18	1,011 (98.7)	13 (1.3)	0.45*	0.50
KWSP	11 (27.5)	29 (72.5)	(1)		39 (97.5)	1 (2.5)	(1)	
Monthly individual's income (RM)								
High	230 (36.3)	404 (63.7)	1.00	0.32	625 (98.6)	9 (1.4)	0.13*	0.71
Low	169 (39.3)	261 (60.7)	(1)		425 (98.8)	5 (1.2)	(1)	
Smoking Status								
Yes	28 (40.6)	41 (59.4)	0.30	0.59	67 (97.2)	2 (2.9)	1.42*	0.23
No	371 (37.3)	624 (62.7)	(1)		983 (98.2)	12 (1.2)	(1)	
Alcohol drinking								
Yes	18 (32.7)	37 (67.3)	0.56	0.45	55 (100.0)	0 (0.0)	0.07*	0.79
No	381 (37.8)	628 (62.2)	(1)		995 (98.6)	14 (1.4)	(1)	
Physical activities								
Active	125 (43.7)	161 (56.3)	6.43	0.01	283 (99.0)	3 (1.0)	0.03*	0.87
Not active	274 (35.2)	504 (64.8)	(1)		767 (98.6)	11 (1.4)	(1)	
Adequate daily consumption of fruits and vegetables								
Yes	85 (35.9)	152 (64.1)	0.35	0.56	233 (98.3)	4 (1.7)	0.06*	0.81
No	314 (38.0)	513 (62.0)	(1)		817 (98.8)	10 (1.2)	(1)	
Body Mass Index								
Not obese	346 (40.8)	502 (59.2)	19.43	<0.01	839 (98.0)	9 (1.1)	2.08	0.15
Obese	53 (24.5)	163 (75.5)	(1)		211 (97.7)	5 (2.3)	(1)	
Social support								
Good	329 (40.5)	484 (59.5)	12.95	<0.01	803 (98.8)	10 (1.2)	0.02*	0.90
Poor	70 (27.9)	181 (72.1)	(1)		247 (98.4)	4 (1.6)	(1)	
Barrier to get health care								
Yes	23 (40.4)	34 (59.6)	0.21	0.65	57 (100.0)	0 (0.0)	0.09*	0.77
No	376 (37.3)	631 (62.7)	(1)		993 (98.6)	14 (1.4)	(1)	
Pre retirement preparation								
Yes	388 (37.9)	636 (62.1)	1.77	0.18	1,011 (98.7)	13 (1.3)	0.00*	1.00
No	11 (27.5)	29 (72.5)	(1)		39 (97.5)	1 (2.5)	(1)	

**Yates correction test*

Multivariate analysis

Table 4 shows the four main predictors for RDSA using forward logistic regression analysis. The non-obese subjects had 2.14 times higher odds for SA and subjects with good social support had 1.78 times higher odds for RDSA compared to their opposite counterparts. The younger and physically active subjects both had 1.3 times higher odds of RDSA than their opposite counterparts.

None of the variables had significant interaction. The regression model was statistically stable, with variance inflation factor measurement < 10. This model fit was based on a non-significant Hosmer-Lemeshow goodness-of-fit test (p = 0.91) and the overall percentage of 62.4% from the classification table. No influential outlier was noted.

None of the studied variables have significant interaction (p>0.05 for all interactions). Therefore, there was no additional interaction term to the main effect variables. The Preliminary Main Effect Model was also checked for multicollinearity (MC) and the results indicated that the regression model was statistically stable with Variance-inflation factor (VIF) measurement less than 10. This model fit was based on a non-significant Hosmer-Lemeshow goodness-of-fit test (p=0.911) and overall percentage of 62.4% from the classification table. When checking for outliers using Cook's influential statistic, none of our data was more than 1.0. Therefore, there was no influential outlier.

Table 4 Factors associated with RDSA among studied population using Multiple Logistic Regression (n=1,064)

Variable	SlogR[1]				MlogR[2]			
	Crude OR	95% CI[4]	χ^2-stat (df)[a]	p-value[a]	*Adj OR*[3]	95% CI[4]	χ^2-stat (df)	p-value
Age group								
<55 years old	1.32	1.02-1.72	4.38(1)	0.04	1.32	1.01-1.73	5.39 (1)	0.02
[≥55 years old]	1.00							
Physical activities								
Active	1.43	1.08-1.88	6.36(1)	0.01	1.39	1.05-1.84	4.32(1)	0.04
[Not active]	1.00							
Body weight status								
Non-obese	2.12	1.51-2.98	20.38(1)	<0.01	2.14	1.52-3.02	20.59(1)	<0.01
[Obese]	1.00							
Social support								
Good	1.76	1.29-2.40	13.35(1)	<0.01	1.78	1.30-2.43	14.02 (1)	<0.01
[Poor]	1.00							

Only variables with significant results were presented in the table.

[1] *Simple Logistic Regression*
[2] *Multiple Logistic Regression*
[3] *Adjusted odds ratio*
[4] *Confidence interval)*
[a] *Likelihood Ratio (LR) test*
[ ]: Reference

DISCUSSION

The results of this study demonstrated that the prevalence of SRSA was much higher compared to RDSA, despite the presence of self-reported chronic diseases and physical limitation identified among subjects. These findings were expected because similar discrepancies between SRSA and RDSA measures have also been widely and consistently reported in a range of populations including among Asians. For example, a study had documented a significant difference in the prevalence between the conventional Rowe and Kahn's SA and SRSA, 18.8% and 50.3% respectively. [15] Meanwhile, another study among African American older adults also stated similar findings with 30% of RDSA, in contrast with 63% of SRSA.[16] Similar trend can be seen among pre-retirement age group population. A study in Scotland among adult aged 57 to 76 years old showed the overall self-rated health SA among their subjects were good but very few of them fulfilled all Rowe and Kahn's criteria of SA. These findings were consistent across age, gender, occupations, as well as individual's personality.[17]

Predictors of RDSA

The second objective of this study was to determine the predictors of RDSA and SRSA. From the bivariate analysis, significant predictors identified for RDSA were younger age, non-obese, being physically active and having good social supports. This is in line with previous study that showed normal body mass index (BMI), regular exercise and social support distinguished people who continued to age successfully four (4) years later from those who did not have it.[18]

This current study suggested that being younger significantly predicted SA, compared to the older age group. This is supported by previous studies that indicated age as one of the predictors for SA in the biomedical model.[19] Even though there was a large-scale review of SA among younger people, some studies had produced the opposite findings. Despite experiencing late-life disability, some people felt they had aged successfully. They tend to use adaptation and coping strategies to align their perception of SA with their experiences. Older age was associated with lower likelihood of RDSA, but with greater likelihood of SRSA.[20]

In the present study, being non obese have 2.1 times higher odds of having SA, which is the highest odds ratio of all the predictors analysed. This association is consistent with prior study. [21] Even a small amount of weight loss (5 to 10% of the initial weight) was beneficial for both young and old people to prevent the adverse effects of obesity. Thus, optimizing body weight and dietary intake were proposed as nutritional strategies towards reducing the risk of age-related chronic diseases.

Previous researches had indicated that 'having good social support' was a significant predictors for SA.[22] Higher levels of social support were beneficial in preventing depressive symptoms,

thus maintaining or improving one's life satisfaction. Those who were able to visit their relatives and friends are more likely to be successful agers. As predicted, our results revealed similar findings. Among various possible predictors that were analysed, 'having good social support' was the second strongest predictor for RDSA. Interestingly, it was also noted to be selected as one of main factors perceived as predictor for SRSA by subjects. This finding contributed to the idea that 'good social support' could be considered as an important predictor for SA regardless of the criteria used for the definition of SA.

This study revealed that being active was a significant predictor for RDSA, but not for SRSA. It is consistent with previous study that showed physically active subjects were more likely to have better aging thus rated as successful agers.[23] Physically active remained to be an important significant determinant of self-perceived health into very late adulthood. Fewer declines in self-rated health can be seen if an individual maintained or increased their moderate physical activity.

Meanwhile, the associations between remaining behaviours variables and both RDSA and SRSA cannot be elicited in this present study. This is inconsistent with previous literature that demonstrated significant linear association between healthy behaviours (namely never smoking status, moderate alcohol consumption and daily intake of fruits and vegetables) and RDSA. Adherence to some health behaviour clusters was associated with a greater likelihood of SA. People with three unhealthy behaviours had a 2.53-fold increased hazard of disability compared to those with none. [24] The possible explanations for the discrepancy were majority of our subjects were female and it is not a norm for Malaysian women to smoke or drink alcohol because the socio-cultural environment discouraged the act. Furthermore, smokers were 30 times higher among men in Malaysia compared to women.[25] Secondly, it could be due to smaller sample size for these variables.

Predictors of SRSA

The subjective perceptions of SA generated by older adults were multidimensional and may not be well represented by any existing SA model. Unlike the fixed criteria or lesser predictors of RDSA, this study found a wider variety of variables perceived by subjects as predictors of SRSA and five (5) main selected factors were having good spiritual or religious practice, happy family, good psycho-cognitive function, good social support and good physical function. These factors were almost similar with predictors of RDSA in this study, except that 'having no major disease' was not one of the main predictors. In line with previous study,[26] most subjects had chosen psychosocial variables as main predictors for SRSA, compared to physiological variables.

In bivariate analysis, none of the studied factors were significantly associated with SRSA. Similar with previous study, there was no association noted between individual's religious practices with SA. Social support were significantly associated with self-reported health and those who have good relationship with their spouse were less likely to experience loneliness compared to people with poorer relationship.[27] A study among Singaporean showed Malays and Indians in Singapore valued more on the roles of spouse and children in SA than the Chinese.[28]

Many published articles had criticized the current SA models for not being comprehensive enough and should include the 'missing voices' in the models. A systematic review[29] that was carried out on 67 articles published from year 1987 to 2013 revealed sixteen articles highlighted that the existing SA model can be still used as baseline but it should be expanded by adding some missing criteria to address the gaps. Almost 50% of the articles emphasised on the need for subjective definition of SA from the perspective of the elders, as an additional criterion.

The discrepancy in the results in this study between RDSA and SRSA could reflect the differences between researchers and lay person's point of view regarding SA. There are no right or wrong answer when it comes to this matter because there is still no consensus on the exact criteria that should be included in defining SA. Thus, it is best to look at both pros and cons of the findings with regards to this discrepancy.

Efforts should be taken to highlight the importance of every individual to take it seriously when it comes to preventing and controlling chronic diseases to avoid more complications related to it. People should be clear that we are not saying this with the intention to criticise or stigmatize whoever did not meet the Rowe and Kahn's definition of SA. There was even study that agreed on the possibility for chronic illness and SA to coexist within the same individual.[30] Indeed, what we want to emphasize here is that every pre-retirement age group adult should have the awareness and knowledge on their health or medical status. Subsequently, actions should be taken to improve it by having regular health screenings, as well as practicing healthy lifestyles. Apart from the roles of health professionals, the goals towards higher prevalence of SA in the future can be achieved if every individual play their part in improving one's well-being.

Considering that, policy maker needs to be more pro-active in the efforts to improve the existing health care services and facilities in order to accommodate the higher needs from the aging population in the future. In this regard, focus should

be made on the needs for rehabilitation services, as well as ensuring adequate budget allocation for these purposes.

The strength of this study was that firstly, it applied wider and comprehensive definitions of SA based on the two points of view namely the objective component (RDSA) and the subjective components (SRSA). Secondly, it involved the preretirement group of population. Thus, it gave better understanding on SA obtained from the comparison made on these two (2) definitions. Subsequently, more focus intervention can be implemented on this group of population based on this study finding which later can results in a higher number of successful agers in their older age.

The limitation in this study was that those with underlying medical problems who were already on long medical leave and had retired early were excluded from the beginning at the sampling stage. Therefore, there is possibility of over or underestimate of the total percentage successful agers for both criteria.

CONCLUSION

The prevalence of SRSA was higher despite the presence of self-reported chronic diseases and physical limitation identified among respondents. The discrepancy in both prevalence of SA reflects the differences that exist between the criteria for SA perceived by respondents and researchers. The misperception of their aging process as 'successful' despite having major diseases, physical or psycho cognitive limitation may worsen their health status because they continue practicing their current unhealthy lifestyles without taking action to improve it. The application of biomedical and lays perspective theories in this study contributed to more comprehensive findings related to SA. Thus, we concluded that it would be best to apply not only the 'biopsychosocial theories' but also the 'spiritual or religious aspect' in studying SA among our population. The importance of practicing healthy behaviours and health conscious attitude should be inculcated among preretirement public servants. Employers play role in providing healthy working environment and carrying out promotional activities on SA.

Compliance with ethical standards

This study was approved by the Research and Ethics Committee of Universiti Kebangsaan Malaysia Medical Centre (UKMMC) and National Medical Research Registry (NMRR) (NMRR-16-375-29271 (IIR)). All participants were approached, informed about the aim of this study, and asked for verbal and written consents.

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