Efficacy of the Health Belief Model in Enhancing Weight Loss Behaviors to Prevent Stroke among Overweight and Obese Geriatrics Homes Residents in Baghdad City

فعالية نموذج المعتقدات الصحية في تحسين سلوكيات فقدان الوزن للوقاية من السكتة الدماغية لدى نزلاء دور رعاية المسنين الذين يعانون من زيادة الوزن اوالسمنة في مدينة بغداد

Mohmmed Qassim Baktash*
Arkan Bahlol Naji **

الخلاصة:
خلفية البحث: السكتة الدماغية هي السبب الرئيس الثالث للوفاة في العراق، يتجاوزها فقط امراض القلب التاجية والوفيات نتيجة الحروب. الشيخوخة مع فرط الوزن تلعبان دورًا حاسماً في تهيئة الناس للاصابة بالسكتة الدماغية. يمكن أن يكون لسلوكيات فقدان الوزن تأثير عميق في حماية كبار السن البدناء من السكتة الدماغية.
الهدف : تهدف الدراسة الى تقييم فعالية نموذج المعتقدات الصحية في تحسين سلوكيات فقدان الوزن للوقاية من السكتة الدماغية لدى نزلاء دور رعاية المسنين الذين يعانون من زيادة الوزن او السمنة في مدينة بغداد.
المنهجية: أستخدمت هذه الدراسة منهجً الدراسة العشوائية الخاضعة للسيطرة. تضمنت الدراسة مشاركة ما مجموعه 63 شخصاً من كبار السن المقيمين في دار المسنين والذين تتراوح معدل كتلة الجسم لديهم ≤ 25 كغم / م2. تم تخصيص المشاركين في الدراسة بشكل عشوائي في واحدة من مجموعتين. المجموعة التجريبية (التداخل) ومجموعة السيطرة (عدم التداخل). تم استخدام تحليل التباين للنماذج المركبة (ANOVA) لقياس التغيير في معتقدات المشاركين لثلاث مرات (T1 و T2 و T3).
النتائج: كان هناك تحسن ملموس في معتقدات المشاركين حول خطورة السكتة الدماغية $F (2, 60) = 8.408, P < 0.000$ و استعدادهم للإصابة بالسكتة الدماغية $F (2, 60) = 7.774, P < 0.001$ و فوائد انقاص الوزن في الوقاية من السكتة الدماغية $F (2, 60) = 9.698, P < 0.000$ و وادراكهم لعوائق انقاص الوزن $F (2, 60) = 8.431, P < 0.001$. اثبتت العمليات الإحصائية البعدية باستخدام اختبار تصحيح بانفروني ان التغيير الحاصل في المعتقدات منسوب الى مشاركي المجموعة التجريبية.
الاستنتاج: نتائج هذ الدراسة لها أهمية سريرية لكونها أوضحت ان معتقدات كبار السن حول السكتة الدماغية والوقاية من هذا الاضطراب الخطير بواسطة المحافظة على الوزن الطبيعي للجسم يمكن الوصول اليه من خلال العمليات المنهجية للتثقيف الصحي. وكذلك اظهرت الدراسة فعالية نموذج المعتقدات الصحية في استنباط مثل هذه الأهداف المرجوة.
التوصيات: توصي هذه الدراسة بإجراء دراسات إضافية لإثبات فعالية نموذج المعتقدات الصحية في تعزيز المعتقدات الصحية المتعلقة بالسكتة الدماغية لدى كبار السن.
الكلمات المفتاحية: السكتة الدماغية، نموذج المعتقدات الصحية ، فقدان الوزن.

Abstract:
Background: Stroke is the third leading cause of death in Iraq exceeding only by coronary heart disease and war related death. Ageing with overweight plays a critical role in predisposing people to stroke; weight loss behaviors can have profound effect in protecting seniors with obesity from stroke.
Aim of study: The study aims to assess the efficacy of the Health Belief Model in enhancing weight loss behaviors to prevent stroke among overweight and obese geriatrics homes residents in Baghdad city.
Methods: This study used a randomized controlled trial approach. Sixty-three seniors from Baghdad geriatrics homes with BMI > 25 Kg/m2 participated in the study and randomly allocated into one of two groups, experimental (intervention group) and control (nonintervention group). A mixed design analysis of variance (ANOVA) was used to measure the change among participant's beliefs over three times (T1, T2, and T3) .
Results: There was a significant improvement among participant's beliefs about seriousness of stroke, $F (2, 60) = 8.408, P < 0.000$, their susceptibility to stroke $F (2, 60) = 7.774, P < 0.001$, benefit of weight loss in preventing stroke $F (2, 60) = 9.698, P < 0.000$ and their perceived barrier to weight loss $F (2, 60) = 8.431, P < 0.001$ over times. However, the post-hoc procedure by using Bonferroni correction test indicated that this change in beliefs was attributed to the experimental group participants.
Conclusion: The results of this study can be clinically important, since it highlighted that elderly people's beliefs about stroke and prevention of this serious disorder by maintaining normal body weight can be reached through systematic process of health education. As well, the study demonstrated the efficacy of the health belief model in eliciting such desired objectives.
Recommendation: This study recommend conducting additional studies to prove the efficacy of the Health Belief Model in promoting improvement upon aged people stroke related beliefs.
Keywords: Stroke, Health Belief Model, Weight Loss.

*** Assistant lecturer, University of Mosul / College of Nursing.**
**** Professor, College of Nursing, Baghdad University. Email: M.gem87@gmail.com.**

INTRODUCTION

Stroke is the second leading cause of death and third leading cause of disability worldwide [(1)]. This sudden life threating event involves a huge physical, psychosocial and financial impact. Burden of stroke exceed the individuals affected by it to include family, health care system and the society as a whole. Data shows that the cost of caring for each stroke case is ranged between US$59,800 to US$230,000 [(1, 2)].

In Iraq, stroke is the third leading cause of death exceeded only by coronary heart disease and war related death. The latest report published by World Health Organization (WHO) in 2017 indicated that stroke related death in Iraq reached 14,315 or 8.13% of country's total deaths [(3)].

Clinically, stroke results from many modifiable and non-modifiable risk factors; age is the strongest determinant of stroke [(1)]. However, ageing with some of additional risk factors can increase people's chance of getting stroke dramatically [(4)]. This is exactly true when we consider ageing with obesity or body mass index (BMI) of ≥ 25 kg/m2. In fact, the human weight plays a critical role in developing stroke either directly by causing tissue inflammation as a results of excess fatty tissue which can lead to difficulty in blood flow and an increased risk of blockage or indirectly by agitating other stroke risk factors such as hypertension, diabetes mellitus, dyslipidemia…etc.[(1,5)].

The earlier stated facts illustrated the roles of age and weight in predisposing people to stroke. It is recognized that we cannot prevent people from ageing; however, preventing obesity and maintaining normal body weight are possible targets by following certain healthy behaviors such as diet and exercise. These weight loss behaviors can have profound effect in protecting seniors with obesity from stroke [(6)].

The Health Belief Model (HBM) is a psychological health behaviors change model developed in 1950 by some of United States (US) public health researchers with the purpose of improving human lifestyle toward healthy behaviors. For more information about using of HBM see systematic review by Abraham & Sheeran, 2015 [(7)]. Of course, we can't live forever, but we can extend our lives and be healthier in old age by making several lifestyle changes [(8)]. The purpose of this study is to determine the efficacy of Health Belief Model in enhancing weight loss behaviors to prevent stroke among overweight and obese geriatrics homes residents in Baghdad city.

AIMS OF STUDY

The study aims to determine the efficacy of the Health Belief Model in enhancing weight loss behaviors to prevent stroke among overweight and obese geriatrics homes residents in Baghdad city.

METHODOLGY

- **Design:**

This study used a repeated measure design with a randomized controlled trial approach to determine the efficacy of health belief model in enhancing weight loss behaviors to prevent stroke among overweight and obese residents of geriatric homes in Baghdad city.

- **Setting, Time and Ethical approval:**

The study was conducted in Iraq, Baghdad city at two nonprofit geriatrics homes (AL-Rashad and Al-Sulaikh) from 4 March 2018 to 2 January 2019. Ethical approval for conducting the study were obtained from Baghdad governorate; Department of Special Needs and followed by the approval of the administrative managers of Baghdad geriatrics homes (AL-Rashad and Al-Sulaikh) (letter of approval number: 79 in 3 march 2018)

- **Sampling and Randomization:**

The target population for this study was the elderly people with Body Mass Index (BMI) more than 25 kg/m2 resident in geriatrics homes of Baghdad city. A sampling frame consisted of 135 seniors distributed at two geriatric homes in Baghdad city (97 seniors at Al-Rashad geriatric home and 38 seniors at Al-Sulaikh geriatric home). A simple random sampling method is used to select the participants of the study. The exclusion criteria include those residents with normal body weight or younger than 50 years old age or those with pervious history of stroke, and severe physical and psychological impairments. The final recruiting processes resulted in 63 seniors accepted to participate in the study.

- **Randomization**

After obtaining the informed consent from the participant, a simple randomization was conducted to allocate them into two groups: experimental (intervention), and control group (non-intervention). Each participant assigned specific number, and then the random allocation number generated by using Statistical Package for the Social Sciences (SPSS) software. Final step of this randomization resulted in 32 subjects in experimental group and 31 subjects in control group.

- **Instrumentation and data collection**

The data for this study was collected by using Cerebrovascular Attitudes and Beliefs Scale Revised (CABS-R). This scale consists of two parts were designed to measure the changes in the people's beliefs about stroke over time and as follow [9]:

Part 1: This part is designed to measures the participant's socio-demographic characteristics, behavioral habits, and clinical history.

Part 2: This part was developed on the bases of health belief model and consisted of 28 items measured in 5 points Likert scale. However, for the purpose of this study we selected only those items that were designed to measure the changes in weight loss behavior (13) items. This scale included four major subscales: (a) perceived seriousness subscale and consisted of 3 items. (b) Perceived susceptibility subscale and consisted of 3 items. (C) perceived benefit subscale and consisted of 4 items and (d) perceived barrier subscale and consisted of 3 items. Response for these items ranged from (1) strongly disagree to (5) strongly agrees with higher score indicating higher perception of beliefs (Table 1).

The required data obtained from the participant by interview method, at three times (Baseline; T1), (Posttest 1; T 2 immediately after 15 minutes from ending of health education session) and (Posttest 2; T 3 after two months from ending of health education session) and each interview takes about 4 to 10 minutes at each sittings.

- **Validity and reliability of instrument**

The CABS-R demonstrated a good validity and reliability in a number of studies [10, 11]. However, for the purpose of this study the validity of the questionnaire was tested by presenting it to (13) experts in nursing and medical fields. According to the expert's recommendations some items were changed and other were modified.

The reliability of the instrument was tested by using data from 10 seniors who were excluded from the study. Cronbach's alphas were calculated to determine the internal consistency of the study instrument (Table 1). The overall internal consistency for the questionnaire was acceptable; α=0.79. On the other hand, the stability and reliability of the total instrument were supported by a test-retest correlation of 0.8 at a 1-month interval.

Table (1): Internal Consistency of the Study Instrument

Beliefs:	**Items**	**a**
Perceived seriousness subscale	3	0.8
Perceived susceptibility subscale	3	0.9
Perceived benefits subscale	4	0.8
Perceived barrier subscale	3	0.7

(**α**): Cronbach's alphas

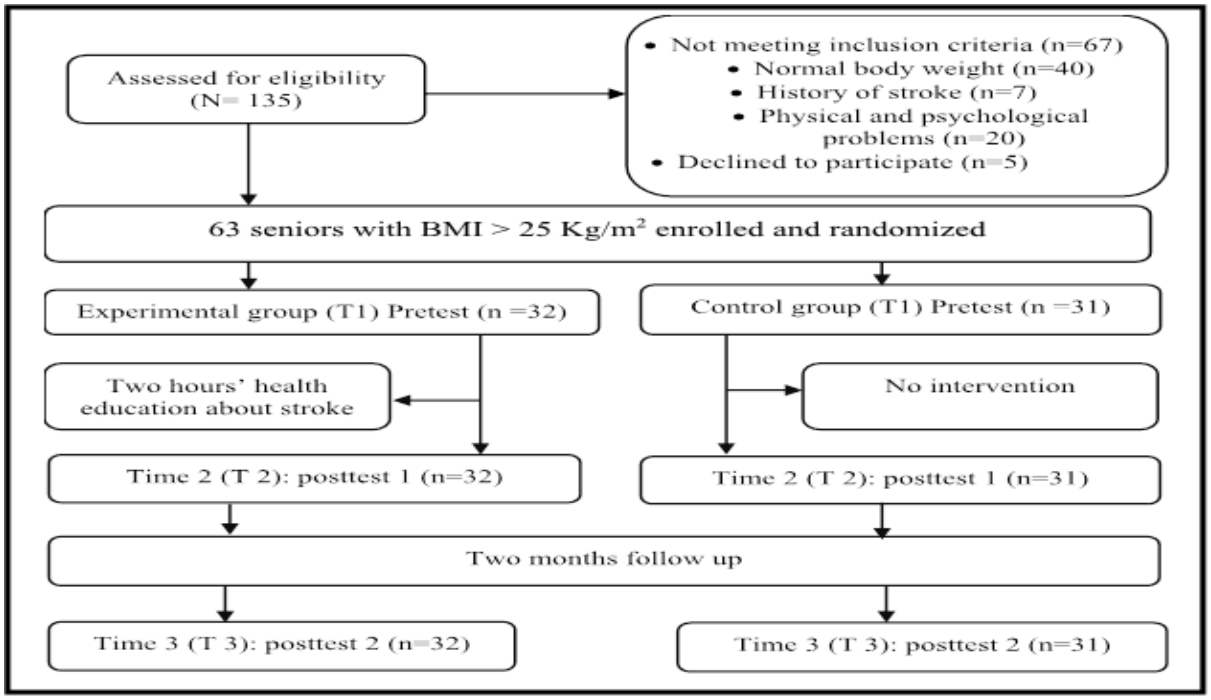
- Procedures:

Our health education about stroke takes about two hours at each selected geriatrics homes. The contents of health education provided to the experimental groups through using lecture method with PowerPoint, data show device, figures and videos about stroke. The contents were organized in two parts and provided according to health belief model concepts.

Specifically, part one of the lectures focused on three areas related to stroke: **(1)** Pathophysiology of stroke and included definition, causes, types, and common signs and symptoms of stroke. **(2)** Susceptibility to stroke and included information about modifiable and non-modifiable stroke risk factors and what make some people susceptible to stroke than others. **(3)** Seriousness of stroke and involved information about stroke consequences and its severity.

Part two: During this part, participants were provided with information about measures that could protect them from stroke. However, the focus was made upon the benefits of weight loss and maintaining normal body weight and how to eliminate the barriers to weight loss. Ultimately a booklet containing information and figures about stroke was provided to the experimental group participants. This procedure was performed as copy in two geriatric homes. Figure (1) illustrates the study processes (Figure 1).

Figure (1): The Study Processes



Data analysis: The Arithmetic mean, standard deviation, frequency and percentage were calculated to describe the participants of the study. Pearson's chi-square and *t*-test were used to explore the homogeneity of characteristics between experimental and control groups at baseline (T1). A mixed design analysis of variance (ANOVA) was used to measure changes in the health belief model concepts over three times (T1, T2, and T3) among groups. For this analysis there was one between subject's factor (group with two levels: Experimental [intervention] and control [non-intervention]) and one with in subject's factor (time of testing with three levels: T1, T2, T3). Data were analyzed by using Statistical Package for Social Science (SPSS) for Windows Version 25.

RESULTS:

Part I: Baseline sample characteristics and homogeneity between groups:

Anthropometric	**Experimental (n=32)**		**Control (n = 31)**		**Total (n=63)**		**t**
	M	**SD**	**M**	**SD**	**M**	**SD**	
Age	66.00	10.03	64.32	7.73	65.17	8.94	0.741
BMI	28.94	3.57	27.60	2.01	28.28	2.96	1.819
Beliefs	**M**	**SD**	**M**	**SD**	**M**	**SD**	**t**
Perceived Seriousness	3.61	0.79	3.64	0.78	3.62	0.78	-0.153
Perceived Susceptibility	2.51	0.78	2.68	0.88	2.59	0.83	-0.818
Perceived Benefit	3.29	0.79	3.21	0.95	3.25	0.87	0.347
Perceived Barrier	2.78	0.65	2.83	0.69	2.80	0.66	-0.245
Characteristics	**F**	**%**	**F**	**%**	**F**	**%**	χ^2
Gender							0.013
Male	18	56.3	17	54.8	35	55.55	
Female	14	43.8	14	45.2	28	44.44	
Educational level							8.753
Illiterate	9	28.1	3	9.7	12	19.04	
Write and Read	4	12.5	11	35.5	15	23.80	
Elementary school	9	28.1	9	29.0	18	28.57	
Intermediate school	6	18.8	3	9.7	9	14.28	
High school and post graduate	4	12.5	5	16.12	9	14.28	
Behavioral habits	**F**	**%**	**F**	**%**	**F**	**%**	χ^2
Smoking							1.914
Never smoked	20	62.5	14	45.2	34	53.96	
Currently smoker	9	28.1	13	41.9	22	34.92	
Stopped smoking	3	9.4	4	12.9	7	11.11	
Physical activity							0.009
Sedentary (never)	21	65.6	20	64.5	41	65.07	
1-5 days per week	11	34.37	11	35.48	22	34.92	
Clinical History (diagnosed with)	**F**	**%**	**F**	**%**	**F**	**%**	χ^2
Family history of stroke	6	18.8	2	6.5	8	12.69	2.148

TIA	6	18.8	5	16.1	11	17.46	0.075
Hypercholesterolemia	17	53.1	12	38.7	29	46.03	1.317
Hypertension	18	56.3	18	58.1	36	57.14	0.984
Diabetes mellitus	18	56.3	17	54.8	35	55.55	0.013
Cardiovascular disease	7	21.9	6	19.4	13	20.63	0.061

Table 2: Sample Characteristics and Homogeneity among Experimental and Control Groups
Note: M: Mean, SD: Standard deviation, F: Frequency, %: Percent, *t*: t-test, χ^2: Chi-square, BMI: Body Mass Index; TIA: Transient Ischemic Attack, All group differences p > 0.05. Diagnosis reported by the participants

According to the table 2 the study participants were 63 residents between 50 - 85 years old, and the mean age was 65.17 (SD= 8.94). Regarding other demographic characteristics most of participants were overweight; M=28.28(SD=2.96), male (55.55%) and having elementary school certificate (28.57%). Concerning behavioral habits, despite that the most of participant stated that they are never smokers (53.96%). The sedentary life style was common among participant (65.07%).Ultimately the descriptive statistics of participant's clinical history revealed that arterial hypertension (57.14%), diabetes mellitus (55.55%) and hypercholesterolemia (46.03%) were the most prevalent clinical risk factors for stroke among participants (Table 2). Finally, there was no significant differences in the participant's characteristics and /or score of beliefs between experimental and control groups at pretest (T1) (Table 2).

Part II: Measuring Changes among Health Belief Model Concepts

Table (3): Descriptive Statistics and Results of Mixed ANOVA Measuring Change in Health Belief Model Constructs Over Time across Study Groups

HBM Constructs	***Groups***	***M (SD)***			**Multivariate *F***
		T1	**T2**	**T3**	
Perceived Seriousness	Ex	3.61 (0.79)	4.07 (0.41)	3.96 (0.68)	F (2, 60) = 9.781, $p <$ **0.000**, $\eta 2$= 0.246
	Co	3.64 (0.78)	3.79 (0.70)	3.89 (0.79)	
Perceived Susceptibility	Ex	2.38 (0.78)	3.07 (0.93)	3.13 (0.93)	F (2, 60) = 7.774, $p <$ **0.001**, $\eta 2$= 0.206
	Co	2.68 (0.88)	2.92 (0.85)	2.90 (0.91)	
Perceived Benefit	Ex	3.29 (0.79)	3.87 (0.44)	3.66 (0.63)	F (2, 60) = 9.698, $p <$ **0.000**, $\eta 2$= 0.244
	Co	3.21 (0.95)	3.49 (0.75)	3.34 (0.78)	
Perceived Barrier	Ex	2.78 (0.65)	2.36 (1.04	2.26 (1.09	F (2, 60) = 8.431, $p <$ **0.001**, $\eta 2$= 0.219
	Co	2.83 (0.69)	2.58 (0.82)	2.37 (0.90)	

Ex: experimental group (n=32), Co: Control group (n=31), M: mean, SD: standard deviation, minimum subscale score = 1, maximum subscale score =5, p < 0.000 indicated in bold

This table indicates that the mean score of participant's beliefs were changed significantly (p<0.000) over time. The analysis test (ANOVA) revealed the changes among beliefs mean scores is a result of time, not of condition (group) or interaction between time of test and types of groups.

Specifically, there was significant main effect of time on participants perceived seriousness, F (2, 94) = 9.781, P < .000, perceived susceptibility, F (2, 94) = 7.774, P < .001, and perceived benefit of weight loss, F (2, 94) = 9.698, P < .000, and perceived barrier to weight loss F (2, 94) = 8.431, P < .001 (Table 3). This result indicates that participant's beliefs about seriousness of stroke, susceptibility to stroke and benefit of weight loss in preventing stroke and perceived barriers to weight loss were changed over time with smaller effect size for these beliefs [η2= 0.246, 0.206, 0.244, 0.219], respectively.

Table (4): Post-hoc Test Using Bonferroni Corrections Procedure

HBM Concepts	*Groups*	Post hoc Using Bonferroni		
		T1 vs T2	T1 vs T3	T2 vs T3
Perceived Severity	Ex	**0.000**	**0.024**	0.550
	Co	0.388	0.194	0.670
Perceived Susceptibility	Ex	**0.002**	**0.000**	1.000
	Co	0.391	0.429	1.000
Perceived Benefit	Ex	**0.000**	**0.027**	0.183
	Co	0.152	1.000	0.539
Perceived Barrier	Ex	**0.007**	**0.009**	1.000
	Co	0.231	0.033	0.261

Ex: experimental group (n=32), Co: Control group (n=31), $p < 0.05$ indicated in bold

On the bases of the results from table 3, the post-hoc procedure by using Bonferroni corrections test was conducted to determine where the difference among the changed beliefs exactly lies. This test revealed that the score of the beliefs were changed significantly among experimental group participants over times ($p < 0.05$). Concerning control group, the post-hoc test revealed fluctuation of the beliefs mean score over times. However, no exact improvement or stable continuous significant change in score over time was observed (Table 4).

DISCUSSION:

Regarding characteristics of participants, some of the results from (Table 2) were consistent with the Iraqi Ministry of health final report (2016). This report demonstrated the low prevalence of smoking among elderly Iraqi populations, as well as this report proved that hypertension; diabetes mellitus and hypercholesterolemia were most prevalent disease and frequent causes of death among older adults in Iraq [(12)].

Table 3 manifested that the participant's beliefs about seriousness of stroke, their susceptibility to stroke, and benefit of weight loss in protecting them from stroke and the barriers associated with weight behaviors were changed significantly from pretest to posttest1 and posttest 2 respectively. On the other hands, the table 4 bring to light that this changes in beliefs were attributed to the significant improvement in the perceptions of experimental group participants. This result confirms the efficacy of Health Belief Model based health education session in promoting improvement in participant beliefs over times.

Despite, what is clarified by the reviewing of literature process about the role of weight loss in preventing stroke, as many studies postulated that overweight is associated with many of other stroke risk factors such as hypertension, diabetes mellitus, and hypercholesterolemia [(1, 2, 13, and 14)]. However, the literature review process indicated scarcity in the number of studies that emphasize on Health Belief Model as a framework for changing belief and thereby the behaviors of older peoples with obesity or overweight. In fact, whole of available literatures lacked to a model of theoretical framework.

CONCLUSION:

Finally, the results of this study can be clinically important, since it highlighted that elder people's beliefs about stroke and prevention of this serious disorder by maintaining normal body weight can be reached through systematic process of health education. As well, the study demonstrated the efficacy of Health Belief Model in eliciting such desired objectives.

RECOMMENDATIONS:

On the basis of the study results and its interpretation this study recommends the following:

1. Conducting additional studies to prove the efficacy of the Health Belief Model in promoting improvement upon aged people stroke related beliefs.
2. Encouraging older people to engage in stroke preventive behavior to eliminate or reduce stoke risks.
3. Performing educational sessions to geriatric homes residents and staffs about seriousness of stroke to bring them to participate in stroke preventive behaviors.

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