



## Self-evaluation by community older adults on the applicability of the healthy beat acupunch exercise program<sup>☆</sup>

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### ABSTRACT

**Objectives** To evaluate the applicability of the Healthy Beat Acupunch (HBA) exercise program for older adults at community care centers and to explore their perceived impacts and suggestions for program protocol after six months of HBA exercises.

**Design & setting** This prospective and descriptive study recruited 113 older adults from four community care centers.

**Intervention** The HBA exercises were conducted 3 times a week, 40 min per session, for six months.

**Main outcome measures** The program evaluation focused on four criteria: simplicity, safety, suitability, and helpfulness of the three phases of the HBA program using a 10-point ladder scale. The semi-structured interviews were focused on the participants' exercise experiences, perceived impacts on their health, and suggestions for the HBA program protocol.

**Results** The average scores of the four criteria in each phase of the program ranged between 9.59 and 9.98 points. Participants reported an increase in their limb flexibility ( $n = 31$ ) and that they were more relaxed ( $n = 26$ ) and more energetic ( $n = 26$ ) after engaging in the HBA exercises. Most of the participants suggested that the HBA program should be offered three times a week, 40 min per session, with 30 people in a group, and led by instructors who were professional, hardworking, easygoing, and enthusiastic, regardless of gender and age.

**Conclusions** The HBA program was rated at a high level of simplicity, safety, suitability, and helpfulness by community older adults, which indicated that the program was considered as appropriate and applicable for the older population.

### 1. Introduction

A properly designed exercise program is a key to motivating older adults to engage in and continue with physical exercises<sup>1</sup> which beneficially contribute to good health and are valuable.<sup>2</sup> The health belief model and protection motivation theory propose that older adults' expectations in benefitting from exercise programs influence their willingness to regularly exercise.<sup>1</sup> If older adults perceived that doing exercise is unnecessary or they felt uncomfortable while exercising,

such perceptions would negatively influence their intentions to exercise.

A review of 17 studies found that many older adults prefer sedentary activities over dynamic activities.<sup>3</sup> Such sedentary behaviors are associated with adverse physical and mental health outcomes.<sup>4,5</sup> Although physical exercises when performed regularly can improve some of the health problems associated with aging,<sup>6</sup> only 21.6% of older adults acknowledged that regular physical exercise is important in their daily life.<sup>7</sup> Hsu et al.<sup>8</sup> stated that the reasons why older adults were

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unwilling to engage in physical exercises for health promotion are associated with their deterioration of vision, hearing, energy, reaction time, and learning capacity caused by aging. Older adults have described physical weakness to be the primary barrier to exercise.<sup>9,10</sup> In Taiwan, 40–50% of older adults have expressed the opinion that they felt too weak and too old to exercise.<sup>11</sup> Although older adults generally knew the importance of being healthy, they did not keep up with exercising to maintain or improve their health. There was a gap between the value of health perceived by older adults and their actual engagement in physical exercises.

Miller and Brown<sup>12</sup> suggested that recognizing older adults' needs, motivations, and barriers to exercise when designing an exercise program would help achieve the purpose of the program. Older adults' needs of regularly engaging in physical exercises include fraternity, convenience, and affordability; motivators to physical exercise are health, enjoyment, social support, and priority; barriers to engaging in physical exercises include health problems, life circumstances, and cost.<sup>12</sup> Resnick and Nigg<sup>13</sup> revealed that social support is an important motivator and that friends or peers could encourage each other and share the experience of participating in physical exercises. Among the indicators regarding health problems, safety and suitability are the most important issues. Although in general older adults would benefit from exercise programs, they could face health-related risks if they engaged in improper exercises.<sup>10</sup> Safety is as important as the benefits of physical exercise. As a result, safety is a priority in designing exercise programs for older adults.<sup>1,13</sup> When injury risks could be minimized, older adults would be more likely to do and continue with exercise programs to maintain their health.<sup>9</sup>

As for the characteristics of the exercise instructor, instructors who are engaging and supportive are essential to a successful exercise program. Suitable instructors make older adults feel safe and confident.<sup>14</sup> Desveaux et al.<sup>14</sup> suggests that the traits of the instructors should include empathy, focus, and effective communication skills. Besides the safety and effectiveness of the exercise programs, exercise program designers could consider designing an exercise that has a culture orientation for older adults in order to elicit their interests in exercise engagement and continuity.<sup>2,12,14</sup> In light of these considerations, suitable exercise designs should consider the demands, capacity, and preferences of older adults as well as safety and health benefits.

In order to achieve healthy aging, numerous exercise programs have been designed and promoted for older adults. Each program was designed to incorporate unique and different mechanisms. The Healthy Beat Acupunch (HBA) exercise program developed by Tsai, Chen, and Huang<sup>15</sup> combines the concepts of traditional Chinese medicine (TCM) meridians and body movements. The meridian system is an essential pathway system guiding qi (life energy) to flow throughout the body. The HBA exercises vibrate meridians by applying fists to acupoints, which are the junction points located on the skin along meridian pathways transporting qi through a connection from the somatic meridian to the internal organs, to activate both internal and external body systems. Activating meridians stimulates flow of qi and blood circulation, and regulates organ functions.<sup>16</sup> Therapies based on TCM could have positive effects on disease-related health outcomes and health maintenance via internal and external interactions in the body.<sup>17</sup> This study aimed to evaluate the applicability of the HBA exercise program for older adults at community care centers and to explore their perceived impacts and suggestions for program protocol after six months of HBA exercises.

## 2. Material and methods

### 2.1. Design, setting, and participants

This prospective and descriptive study was conducted at four community care centers in Kaohsiung, southern Taiwan. Convenience samples were recruited from older adults who attended activities at

these four centers. Inclusion criteria were: (a) community older adults aged 65 or older, (b) mildly to moderately dependent or completely independent on the activities of daily living (ADL) as screened by the Barthel Index (BI) with a score of 61 or higher<sup>18</sup> and (c) no cognitive impairments as screened by the Short Portable Mental Status Questionnaire (SPMSQ) in which those aged 74 or younger and 75 or older should score 6 points or higher and 5 points or higher, respectively.<sup>19</sup> Older adults with severe pulmonary, cardiovascular, or musculoskeletal diseases were excluded.

### 2.2. Ethical considerations

This study was approved by the institutional review board of a university hospital (KMUH-IRB-20140089). The principal investigator explained the process of the study to the administrators of the centers prior to data collection. Agreed by the administrators, information regarding the HBA exercise program was posted on the bulletin board in the centers and explained to the older adults by research team members. Based on the recruitment criteria, all qualified older adults who agreed to participate in the study received an overview of the study and signed a written informed consent. Participants were made aware of their rights to withdraw from the study at any point, and confidentiality and anonymity were assured.

### 2.3. Intervention

The HBA exercise was a 6-month program delivered in a group setting. Under the supervision and instruction of trained instructors, the older adults came together to perform the HBA exercises three times a week for six months. Each session lasted for 40 min. The principle of the HBA exercise is to swing the arms and naturally locate the fists on the acupoints. According to Tsai et al.<sup>15</sup> the HBA program is made up of three phases: (1) activating qi and blood (warm-up), (2) punching meridians (exercise), and (3) relaxing body and mind (cool-down). The first phase, activating qi and blood, lasts 8 min and includes 5 motions to loosen up joints, warm up the body, and adjust breathing. The second phase, punching meridians, lasts 19 min followed by a 5-minute break and includes 14 motions to strengthen cardiorespiratory endurance and vital capacity, to activate qi and blood circulation, and to boost energy. At this phase, the older adults swing their arms and gently direct the fists onto the targeted acupoints to activate the flow of qi and blood circulation by six different punching styles, including dragon fist, tiger fist, trunk fist, phoenix fist, palm beat, and back beat. The final phase, relaxing body and mind, lasts 8 min and includes 5 motions to relax muscles and stretch the body (Table 1).

The older adults learned and familiarized themselves with the motions of the HBA exercises for the first month of the program and mainly focused on practicing and doing the HBA exercises for the last five months. All of the exercise instructors had 9 h of training and received certificates upon completion. Three instructors were involved in each exercise session. One of the instructors was the primary instructor, and the others provided assistance and ensured the safety of the participants. The instructing steps were that the instructor introduced and demonstrated a motion, and the participants followed and performed the motion. The assistant instructors corrected the participants' motions if necessary.

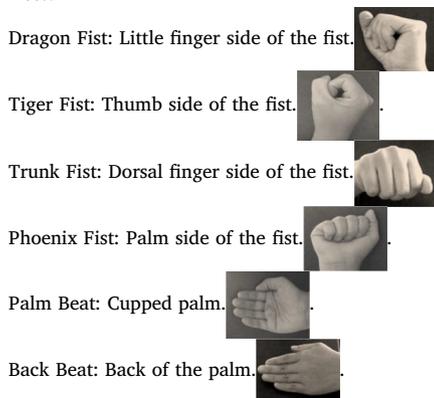
### 2.4. Data collection

The study was conducted from May 2016 to November 2016. In order to understand the experiences of the older adults who engaged in the HBA exercise program for six months, this study employed both a self-administered questionnaire and a semi-structured interview. An evaluation scale, ranging from 0 to 10, was used to evaluate each phase of the program on its simplicity, safety, suitability, and helpfulness. Simplicity refers to the level of difficulty in performing the motions,

**Table 1**  
The Healthy Beat Acupunch (HBA) Exercise Program.

Phase / Motion Name	Action Site
Phase I: Activating Qi and Blood	
1. Expanding the chest	Shoulders; Arms
2. Swinging the arms	Shoulders; Arms; Thighs; Knees; Lower legs
3. Thanking heaven and earth	Shoulders; Arms; Waist
4. Turning the torso	Shoulders; Arms; Waist
5. Embracing chest and lifting legs	Arms; Hips; Thighs; Knees; Ankles
Phase II: Punching Meridians	
1. Punching the shoulders with phoenix fist	Shoulders; Arms; Elbows; Thighs; Knees
2. Punching the upper chest with phoenix fist	Arms; Elbows; Thighs; Knees
3. Punching the armpits with tiger fist	Shoulders; Arms; Waist; Ankles
4. Punching the outer arms with phoenix fist	Arms; Elbows; Waist; Hips
5. Punching the forearms with dragon fist	Arms; Elbows; Waist; Hips
6. Punching the little finger side with palm beat	Arms; Elbows; Waist; Hips
7. Punching the center chest with palm beat	Arms; Elbows; Thighs; Knees
8. Punching the lower ribs with palm beat	Arms; Elbows; Thighs; Knees
9. Punching the lower abdomen with palm beat	Arms; Elbows; Thighs; Ankles
10. Punching the lower back with back beat	Arms; Elbows; Thighs; Knees; Ankles
11. Punching the buttocks with tiger fist	Arms; Thighs; Knees; Ankles
12. Punching the forelegs with trunk fist	Arms; Hips; Thighs; Knees; Ankles
13. Punching the inner legs with dragon fist	Arms; Elbows; Hips; Thighs; Knees
14. Punching the outer legs with phoenix fist	Arms; Hips; Thighs; Knees
Phase III: Relaxing Body and Mind	
1. Shouting to the sky	Shoulders; Arms
2. Calming with palms clasped	Arms
3. Soothing face and neck muscle	Arms; Face; Neck
4. Warming the body	Arms
5. Massaging the thighs	Palm; Hips; Thighs; Knees

Note:



with a score of 0 representing very difficult and 10 very easy. An open-ended question asked the participants to indicate which motion was the most difficult and which was the easiest to perform. Safety refers to the level of risk, with a score of 0 representing very dangerous and 10 representing very safe. Participants also indicated which motion was the safest and which was the most dangerous. Suitability refers to how suitable the participants considered the motion to be for them. A score of 0 suggested very unsuitable and 10 suggested very suitable. An open-ended question asked the participants to indicate which motion was the least and which was the most suitable for them. Helpfulness refers to the effectiveness of each motion for promoting health. A score of 0 suggested not helpful at all and 10 suggested very helpful. Participants

were also asked to indicate which motion was the least and which was the most helpful. The older adults could provide additional comments or suggestions at the end of the questionnaire.

Participants' perceptions of the HBA exercises were obtained from a semi-structured interview that consisted of the following six questions: (1) What kinds of changes have you experienced after completing the HBA exercise program? (2) In your opinion, how many participants in an HBA exercise group would be appropriate? (3) How many times a week is suitable for you to engage in HBA exercises? (4) What length of a HBA session would you prefer? (5) What characteristics do you think the instructor needs to have? and (6) Would you recommend the HBA exercise to your friends? These questions were validated by experts. The research assistants who conducted the interviews were trained to adhere to the interview guidelines.

### 2.5. Data analysis

Descriptive statistics of percentage, frequency, mean, and standard deviation were used to describe the characteristics of the participants and to report the results of the HBA program evaluation. The Statistical Product and Service Solutions (SPSS) version 19 was used for statistical analysis. Content analysis was used to analyze the open-ended questions and interviews. Consent opinions and suggestions, identified from repeated phrases, were categorized by their frequency and percentage of appearance.

## 3. Results

### 3.1. Characteristics of the participants

A total of 113 older adults enrolled in this study and completed the 6-month HBA exercise program. The mean age of the participants was 74.65 ± 6.03 years. The majority of participants was women (82.3%), married (53.1%), and lived with their family (91.2%). Most of the participants (89.4%) had an exercise habit, with an average of 3.92 ± 2.11 times a week for duration of 45.22 ± 27.58 min per time.

**Table 2**  
Demographic Characteristics of the Participants (N = 113).

Variables	M	SD	n	%
Age	74.65	6.03		
Gender				
Male			20	17.7
Female			93	82.3
Marital status				
Married			60	53.1
Widowed / Divorced			53	46.9
Living condition				
Live alone			10	8.8
Live with family			103	91.2
Education				
Illiterate			45	39.8
Elementary school			52	46
High school and above			16	14.2
Exercise habit				
No			12	10.6
Yes			101	89.4
Exercise frequency (times / week)	3.92	2.11		
Exercise duration (minutes / session)	45.22	27.58		
Chronic disease				
No			33	29.2
Yes			80	70.8
Chronic disease number	1.04	0.88		
Cognitive function <sup>a</sup>	9.71	0.62		
Activities of daily living <sup>b</sup>	99.82	1.48		

Note:

<sup>a</sup> Measured by the Short Portable Mental Status Questionnaire (SPMSQ).  
<sup>b</sup> Measured by the Barthel Index (BI).

Approximately 71% of the participants had a chronic disease, with an average of  $1.04 \pm 0.88$  chronic diseases. The cognitive functions of the participants were intact and completely independent (Table 2).

### 3.2. HBA program applicability evaluation

In the first phase of the HBA program, activating qi and blood, the means of the four criteria ranged from 9.65 to 9.96 points. Participants reported motion #1 (expanding the chest) to be the easiest (74.3%) and the safest (78.8%) motion. They considered motion #4 (turning the torso) to be the most suitable motion (35.4%), and motion #5 (embracing chest and lifting legs) to be the most difficult (12.4%) and dangerous (13.3%) one. However, motion #5 was also considered to be the most helpful motion (57.5%).

For the second phase of the program, punching meridians, the means of the four criteria ranged from 9.59 to 9.96 points. Participants reported motion #1 (punching the shoulders with phoenix fist) to be the easiest motion (46%), and motion #5 (punching the forearms with dragon fist) as the safest motion (35.4%). Motion #9 (punching the lower abdomen with palm beat) was seen as the most suitable motion (24.8%), and motion #3 (punching the armpits with tiger fist) to be the most helpful one (39.8%). By contrast, participants rated both motions #3 and #12 (punching the forelegs with trunk fist) as the most difficult motions (8.8%, respectively), and motion #12 as the most dangerous one (8.8%). Apart from those evaluations, the participants suggested that the break time could be extended to 10 min after the second phase.

As for the third phase, relaxing body and mind, the means ranged from 9.86 to 9.98 points for simplicity, safety, suitability, and helpfulness. Participants perceived motion #1 (shouting to the sky) to be the easiest motion (50.4%) and motion #3 (soothing face and neck muscle) to be the safest one (43.4%). They saw motion #2 (calming with palms clasped) to be the most suitable (55.8%) and helpful motion (54.9%). For all three phases of the program, none of the participants regarded any of the motions as unsuitable or not helpful (Table 3).

### 3.3. Perceptions and suggestions for the HBA program protocol

After six months of HBA exercises, most of the participants perceived changes in body and mind (Table 4). The majority of participants ( $n = 112$ , 99.1%) would recommend the HBA program to their friends, relatives, or family members. As for the program protocol, more than half of the participants ( $n = 66$ , 58.4%) suggested 30 people in a group to be an appropriate number. The favored exercise frequency and duration were 3 times per week ( $n = 94$ , 83.2%) and 40 min per session ( $n = 107$ , 94.7%). The participants preferred the instructor to be professional ( $n = 39$ , 34.5%), hardworking ( $n = 29$ , 25.7%), easygoing ( $n = 19$ , 16.8%), enthusiastic ( $n = 18$ , 15.9%), and amiable ( $n = 15$ , 13.3%). Most of the participants said they did not have any preference regarding the instructor's gender ( $n = 69$ , 61.1%) and age ( $n = 34$ , 30.1%).

**Table 3**  
Applicability Evaluation of the Healthy Beat Acupunch Exercise Program ( $N = 113$ ).

	Simplicity		Safety		Suitability		Helpfulness	
	M	SD	M	SD	M	SD	M	SD
Phase I								
Activating Qi and Blood	9.65	0.68	9.70	0.67	9.96	0.21	9.96	0.21
Phase II								
Punching Meridians	9.59	0.75	9.84	0.43	9.95	0.23	9.96	0.21
Phase III								
Relaxing Body and Mind	9.86	0.97	9.98	0.13	9.96	0.19	9.96	0.23

Note. M = mean; SD = standard deviation.

**Table 4**  
Perceived Changes of Older Adults after the Health Beat Acupunch Exercises ( $N = 113$ ).

Physical and Mental Changes	n	%
Limbs more flexible	31	27.4
Body more relaxed	26	23
Felt more energetic	26	23
Became more agile	22	19.5
Became stronger	19	16.8
Felt less pain	6	5.3
Maintained body functions	5	4.4
Became happier	5	4.4
Reduced body weight	3	2.7
Improved endurance	2	1.8
Experienced more life fulfillment	2	1.8
Had more regular bowel movements	1	0.9
Experienced cleansing of upper respiratory tract	1	0.9

## 4. Discussion

The HBA program was rated at a high level of simplicity, safety, suitability, and helpfulness by the community older adults, which indicated that the program was considered as appropriate and applicable for the older population. The older adults perceived positive outcomes for physical and mental health, and they would recommend the HBA program to their friends and family. However, this study found that certain motions, such as motion #5 in the first phase and motions #3 and #12 in the second phase, were regarded as difficult because the older adults felt that they could not accurately perform the motions. Confidence seems to have an impact on older adults' perceptions towards exercise motion difficulty<sup>11</sup> Nevertheless, the older adults in this study still agreed that the motions offered benefits and value for their health. Older adults are usually interested in learning new skills with challenges,<sup>20</sup> although they have certain difficulties in learning new skills.<sup>8,21,22</sup> A sense of achievement is an important motivator for increasing older adults' adherence to an exercise. Moreover, health status also appeared to have a perceived effect on participation. Compared to younger adults, older adults place more emphasis on the benefits and effects of exercise to their physical health.<sup>23</sup> An exercise program that offers physical benefits will motivate older adults to engage in the program.

Safety is another important factor in exercise program design for older adults. Most of the motions in the HBA program were perceived as safe. However, the participants felt that motion #12 in the second phase was risky because they sensed a feeling of poor balance resulted from having to lift legs and shift body weight from one foot to another. Several studies have demonstrated that losing one's balance can easily result in falling<sup>24,25</sup> For older adults, falls are particularly harmful because they not only cause physical harm but also have adverse psychological impacts. Older adults generally are afraid to exercise again after they have suffered from a fall.<sup>26,27</sup> Therefore, an important safety consideration for future HBA exercise program implementation is to ensure that exercise instructors illustrate the correct way to safely lift legs and shift body weight from one foot to another and to extend the preparation time before shifting the body weight.

As for the suitability of an exercise program, several studies have demonstrated that factors such as stamina, muscle strength, and muscle endurance can affect suitability when tailoring the program to older adults<sup>28,29</sup> The older adults in this study felt that the motions in the HBA program were appropriate for them to perform. In addition, the perceived benefits of the HBA exercise program are not only an improvement in physical health but also in the flow of qi and blood circulation, which was also evidenced in previous studies that showed health could be improved by meridian stimulation.<sup>30,31</sup> The perceived impact of the HBA program was positive and contributed to the older adults' mental and spiritual health as well.

As for the exercise frequency and duration, the older adults' recommendation of 3 times a week and 40 min each session for the HBA program was consistent with the findings of Chen, Tseng, Huang, and Li<sup>33</sup> However, the finding contradicts with the results reported by Lee et al. in which they suggested participants exercise twice a week with moderate-intensity aerobic exercises 150 min per session or vigorous-intensity exercises 75 min per session.<sup>10</sup> In addition, older adults in this study also suggested that the break time should be extended after the second phase indicating that older adults need a longer break while doing an exercise. Nigg and Durand<sup>1</sup> indicated that many older adults with chronic diseases or age-related conditions do not have enough energy to keep doing exercise as long as general adults do without sufficient rests in between. Thus, older adults' exercise frequency and duration should be considered while designing an exercise program.

As for group size, most of the older adults in this study preferred practicing HBA exercises in a group setting indicating that social engagement influences the older adults' willingness to participate in physical exercises. Social support is a factor that motivates older adults to engage in physical exercise and to share successes and challenges<sup>12,13</sup> The older adults in this study preferred to practice the HBA exercises in a group of 30 people for each exercise session. This suggestion, however, differs from an earlier study's results that indicated that the preferred number of participants is between 15 and 20.<sup>32</sup> This discrepancy may be attributable to the different intervention designs, venues, and participant characteristics.

The characteristics of and relationship with the exercise instructor could also affect the motivation and willingness of older adults to engage in and continue with an exercise<sup>14,20</sup> This study found that instructors who are hardworking, professional, easygoing, and amiable are appealing to the older adults. These results are similar to the findings of Phillips, Baltzer, Filoon, and Whitley that the preferred characteristics of instructors in adult education are professional, have outstanding communication skills, and show respect for others<sup>34</sup> Factors of instructor characteristics should be considered when designing and administering an exercise program that is tailored to older adults.

#### 4.1. Limitations and further research recommendations

Some potential limitations of the study need to be considered. First, the study did not have in-depth interviews with the older adults for the purpose of HBA exercise program evaluation. In-depth surveys such as focus-group interviews would have allowed us to gain more insights into the thoughts of older adults, leading to a better exercise design that would be more suitable for them. In addition, positive perceptions of older adults were found toward the instructors; whether the characteristics of the instructors influenced the intentions to exercise of the older adults is a phenomenon that merits further investigation. Since the study was conducted in southern Taiwan, it may not be generalizable. In the future, similar studies could be conducted and examined in different sites or with different subjects. Moreover, a larger study with reliable and valid instruments to obtain data regarding physical, psychological, and spiritual effects of the intervention is recommended. A further investigation of the effectiveness of the HBA exercise program could also be made by comparing it under different circumstances or led by different instructors.

#### 5. Conclusions

This study found that the HBA program is an appropriate exercise for community older adults. The practice of HBA exercise improves physical health and mental state of community older adults and may encourage the older adults to adopt healthier and more active lifestyles. As the aging population is rapidly increasing, the demand for healthy aging through community-based interventions, such as physical exercises, is increasing. However, any potential physical exercise program should be carefully evaluated prior to a large-scale implementation.

Proper assessment and evaluation prior to physical exercise implementation ensure participant engagement and continuity. The effectiveness of a properly designed physical exercise program for older adults in the community could thus be maximized

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#### Declaration of interest

None.

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The funding source supported this study financially and had no involvement in the study design, data collection, analysis and interpretation of data, report writing, and decision to submit the paper for publication.

#### Contributors

All authors meet the criteria for authorship, have approved the final article, and all those entitled to authorship are listed as authors.

#### Institutional review board approval

The Institutional Review Board of Kaohsiung Medical University Chung-Ho Memorial Hospital approved this study (KMUH-IRB-20140089).

#### Clinical trial registration

Clinicaltrials.gov (NCT02567864). The trial was first posted on October 5, 2015. This part of the data was collected from May 2016 to November 2016.

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