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Gymnastics Assistance for the Independent Elderly: Service in Efforts to Prevent Dementia in Bulak Village, Surabaya

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ABSTRACT Degenerative diseases are prevalent among the elderly and are closely associated with physiological decline, which increases the risk of chronic conditions such as hypertension, diabetes, osteoarthritis, and dementia. These health issues can significantly reduce quality of life and limit independence. Therefore, preventive and promotive interventions are essential to maintain the well-being of older adults. This community service program aimed to promote independent living and prevent dementia through health education, nutritional counseling, and elderly gymnastics in Bulak Village, Surabaya. The activity was conducted collaboratively by lecturers and students from the Poltekkes Kemenkes Surabaya, targeting elderly participants in RW 2. The methods applied included counseling sessions on degenerative diseases, routine health check-ups (blood pressure, glucose, cholesterol, and uric acid measurements), and practical elderly gymnastics exercises to improve physical and mental health. Evaluation of participants' understanding was carried out using pre- and post-tests. The results demonstrated that 90% of the elderly showed increased knowledge about degenerative diseases and expressed enthusiasm in participating in health screenings and gymnastics. Health examination data revealed that 76% of participants had elevated blood pressure, while 58% were at risk for diabetes, indicating the need for continued health monitoring and education. Overall, the program enhanced awareness, encouraged active lifestyles, and fostered community collaboration among health cadres and local health centers. In conclusion, the implementation of structured counseling and elderly gymnastics proved effective in improving health literacy and promoting independence among the elderly. Sustained coordination between healthcare workers and elderly cadres is recommended to ensure program continuity and long-term impact.

INDEX TERMS Elderly empowerment, Degenerative disease prevention, Health education, Elderly gymnastics, Dementia prevention

I. INTRODUCTION

The increasing prevalence of degenerative diseases among the elderly has become a significant global health concern, particularly in developing countries such as Indonesia. Degenerative diseases including hypertension, diabetes mellitus, osteoarthritis, cardiovascular disorders, and dementia are strongly associated with aging and physiological decline, which can lead to reduced physical performance, impaired cognitive function, and dependence on caregivers [1], [2]. In Indonesia, the proportion of elderly individuals continues to rise, with the Central Statistics Agency reporting that life expectancy reached 73.3 years in 2022, reflecting improvements in health services yet also increasing the burden of age-related diseases [3]. These conditions often result in decreased quality of life, social isolation, and an economic burden for families and the healthcare system [4], [5].

Numerous studies have emphasized the importance of preventive and promotive approaches to maintain the health and independence of older adults. Physical activities such as elderly gymnastics, brain exercise, and balance training have been proven effective in improving cardiovascular endurance, muscle strength, and cognitive performance [6]–[8]. Similarly, nutritional education and regular health check-ups contribute significantly to the prevention of metabolic and degenerative disorders [9], [10]. Current community-based models often combine physical exercise with education to promote health literacy and social interaction among elderly populations [11], [12]. However, despite growing awareness, many elderly individuals in Indonesia particularly in low-income urban areas still face barriers to implementing healthy lifestyles due to limited access to structured programs, lack of motivation, and inadequate community support [13], [14].

The state-of-the-art interventions in elderly care emphasize integrative and participatory methods, including community empowerment, cross-sector collaboration, and technology-assisted monitoring [15], [16]. Various studies have utilized digital applications for remote exercise supervision, telehealth for chronic disease management, and

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capacity building for local health cadres [17], [18]. Yet, many initiatives remain research-oriented and are not widely implemented in local community health programs. This gap highlights the need for practical, replicable community service models that align with the social and cultural contexts of Indonesian elderly populations [19], [20].

Addressing these challenges, this study aimed to implement and evaluate a community service program designed to enhance elderly independence and prevent dementia through health education, nutritional counseling, and gymnastics activities in Bulak Village, Surabaya. The program integrates promotive and preventive strategies by involving multidisciplinary lecturers and students from Poltekkes Kemenkes Surabaya and collaborating with local health cadres to ensure sustainability and relevance. The main contributions of this study are as follows:

1. To develop and apply a participatory elderly assistance model that combines education, health screening, and physical activity as an integrated community service strategy.
2. To evaluate the impact of elderly gymnastics and counseling activities on knowledge improvement, motivation, and health behavior among older adults.
3. To strengthen the collaboration framework between local health cadres, healthcare centers, and academic institutions for continuous elderly care development.

The remaining sections of this article are structured as follows. Section 2 describes the methodology applied in implementing the community service program. Section 3 presents the key findings from the counseling, health checks, and gymnastics activities. Section 4 discusses the implications of the results by comparing them with related studies and identifying the program's limitations. Finally, Section 5 concludes the study and provides recommendations for sustainable elderly empowerment initiatives

II. METHOD

A. STUDY DESIGN AND RATIONALE

This study employed a community-based participatory service model with a prospective, quasi-experimental design conducted from July to September 2022. The objective was to evaluate the effectiveness of health education, nutritional counseling, and elderly gymnastics on improving knowledge and health behavior related to degenerative disease prevention among older adults in Bulak Village, Surabaya. The study adopted a non-randomized single-group pretest–posttest approach, allowing for comparison of participants' knowledge and physiological outcomes before and after the intervention [26], [27].

B. STUDY SETTING

The program was implemented in RW 2 of Bulak Village, Surabaya City, East Java, Indonesia, an area characterized by a high proportion of elderly residents with limited access to structured health programs. The selection of this site was based on preliminary data from the local Posyandu Lansia (Elderly Health Post), which reported high incidences of hypertension, diabetes, and hypercholesterolemia among its members. Preparatory activities including coordination meetings, ethical clearances, and permission letters were conducted in collaboration with the Bulak Village Health Center and Poltekkes Kemenkes Surabaya

C. PARTICIPANTS AND SAMPLING METHOD

The study population consisted of all elderly individuals registered at Posyandu Lansia RW 2. Using inclusion and exclusion criteria, a purposive sample of 40 participants aged between 60 and 80 years was selected. Inclusion criteria were being an active Posyandu Lansia membercognitively capable of understanding the counseling session, physically able to perform basic exercise movements. Exclusion criteria included diagnosed severe dementia, physical disability preventing participation in gymnastics, and unwillingness to participate. The sampling procedure followed ethical standards and voluntary participation, with all respondents providing informed consent before involvement. Although non-randomized, the sample represented the general elderly demographic of the area in terms of age, sex, and health status [28].

D. MATERIALS AND EDUCATIONAL INTERVENTION

The intervention utilized various materials and health measurement tools, including:

1. Sphygmomanometer for blood pressure measurement (Omron HEM-7120 model).
2. Digital glucometer for capillary blood glucose levels (Accu-Chek Active).
3. Portable cholesterol meter (EasyTouch GCU).
4. Weighing scale and stadiometer to calculate Body Mass Index (BMI).
5. Educational materials, including posters, flipcharts, and handouts on degenerative disease prevention and healthy nutrition prepared by lecturers and students.
6. Gymnastics equipment, including mats, chairs, and audio playback devices for guided exercise.

All tools were calibrated prior to use, following the measurement standards of the Ministry of Health and manufacturer guidelines to ensure data reliability [29].

E. DATA COLLECTION INSTRUMENTS AND PROCEDURE

The community service consisted of three main components health education and counseling, health examination and data collection, and elderly gymnastics and mentoring.

1. HEALTH EDUCATION AND COUNSELING

The counseling sessions aimed to increase knowledge of degenerative diseases, risk factors, and preventive behaviors. Topics included healthy diet, physical activity, and early symptom recognition. Counseling was delivered interactively using visual media and followed by a question-and-answer session. Participants' knowledge was assessed using pretest and post-test questionnaires containing 10 multiple-choice questions on degenerative diseases and healthy lifestyle habits [30].

2. HEALTH EXAMINATION

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Each participant underwent a basic health screening covering blood pressure, blood glucose, total cholesterol, uric acid, weight, and height. The examinations were supervised by nursing and nutrition students under professional guidance. All measurements were recorded in individual health logs for baseline and post-intervention comparison [31].

3. ELDERLY GYMNASTICS AND PHYSICAL ACTIVITY

The gymnastics program was conducted twice a week for four consecutive weeks, led by trained health cadres. The routine included stretching, rhythmic movements, balance training, and light aerobic activity designed for elderly individuals. Each session lasted approximately 45 minutes. Attendance and adherence were documented. The exercise modules were adapted from the Indonesian Ministry of Health's Elderly Physical Activity Guidelines (2021) [32].

F. DATA ANALYSIS

Data were collected through observation, questionnaire responses, and physiological measurements. Quantitative data such as blood pressure, glucose, cholesterol, and BMI were analyzed descriptively using mean and percentage distributions. Knowledge improvement was determined by comparing pretest and post-test scores. Qualitative observations such as participant enthusiasm and cadre involvement were documented for narrative analysis.

The evaluation focused on three outcome indicators:

1. Increased knowledge score,
2. Improved physical health parameters, and
3. Enhanced participation in gymnastics sessions.

Data were processed using Microsoft Excel 2021 and verified manually to ensure accuracy [33]..

G. ETHICAL CONSIDERATIONS

Ethical clearance for this community service program was obtained from the Poltekkes Kemenkes Surabaya Research Ethics Committee. Participants received information about study objectives, procedures, benefits, and confidentiality. No invasive medical procedures were performed, and participation was entirely voluntary. The activity adhered to the Declaration of Helsinki (2013) regarding research involving human participants [34].

III. IMPLEMENTATION

A. PREPARATION

The activity began with a proposal in July 2022, data collection, location permits for community service activities between the managers of Bulak village posyandu cadres and the Departemen of health Poltekkes Kemenkes Surabaya.

B. ACTIVITIES AND SCHEDULE

The training will be held in the Hall Room of Posyandu RW 2, Bulak sub-district.

IV. RESULTS

A. COUNSELING ON DEGENERATIVE DISEASES IN THE ELDERLY

The purpose of this counseling is to provide information, education, and support to the elderly so that they can understand the importance of preventing degenerative diseases and can implement a healthy lifestyle[12]. Evaluation of participants' knowledge using pretest and post-test.

FIGURE 1 As a result of counseling on degenerative diseases in the elderly in general, participants can understand what is meant by degenerative diseases, the main risk factors for the occurrence of degenerative diseases in the elderly[13], In this case, 90% of the elderly can answer, among others, the main risk factors, namely age, genetic factors, unhealthy lifestyle (such as smoking, high-fat foods, and lack of physical activity), then the question of what the elderly do to prevent degenerative diseases, 90% of the elderly answer to maintain a balanced diet, exercise regularly, do not smoke, avoid excessive alcohol, and undergo regular health checks at the Health Center [14].

FIGURE 1. Counseling Activities for the Elderly about the introduction of degenerative diseases

B. HALTH CHECK

Health examination activities involve nursing students which include sphygmomanometer, blood sugar and kholesterol examination. FIGURE 2

FIGURE 2. Sphygmomanometer Examination Activities for Elderly Cadres of Bulak Village, Surabaya

FIGURE 3 The results of blood sugar examination show that the elderly who have a risk of diabetes as much as 21% (8 individuals), the risk of prediabetes as much as 37% (15 individuals) and normal as much as 42% (17 individuals), This shows that the elderly still have a risk of almost 58% suffering from diabetes, so it is necessary to socialize degenerative disease counseling.

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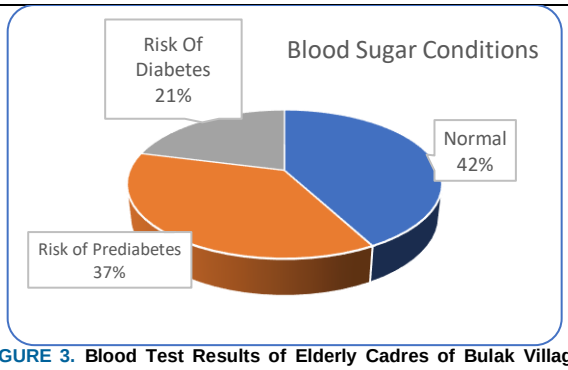

FIGURE 3. Blood Test Results of Elderly Cadres of Bulak Village, Surabaya

Furthermore, the results of sphygmomanometer examination before training showed a high tendency of around 76% (30 org) (>130/80 mmHg) and a normal tendency of around 24% (10 org) (<120/80 mmHg). FIGURE 4

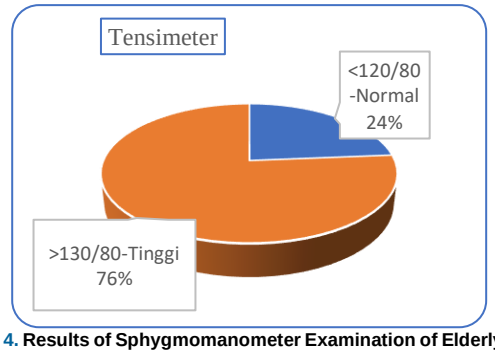

FIGURE 4. Results of Sphygmomanometer Examination of Elderly Cadres of Bulak Village, Surabaya

In **FIGURE 4** it shows the potential tension above >130/80 indicates a high risk of hypertension of about 76%). Furthermore, the results of the BMI examination of the elderly were obtained with a BMI of around 66% (26 org), Normal around 34% (14 org).
Furthermore, to describe the nutritional status of the elderly using the BMI **(**Body Mass Index**)** index as shown in FIGURE 5. It was found that more than 66% of the elderly have more weight, but do not tend to be obese, here are the results of the elderly weighing FIGURE 5

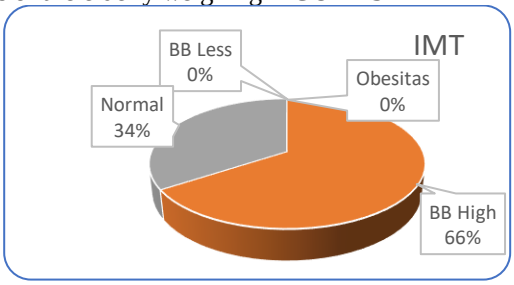

FIGURE 5. BMI Measurement Results of Elderly Cadres of Bulak Village, Surabaya

V. DISCUSSION

A. INTERPRETATION OF RESULTS

The results of this community service program demonstrated significant improvements in elderly participants' health knowledge, awareness, and physical well-being following the interventions in Bulak Village, Surabaya. The evaluation indicated that 90% of the elderly showed an improved understanding of degenerative diseases, including their risk factors and preventive strategies. Moreover, participants demonstrated a strong level of enthusiasm and adherence to the elderly gymnastics sessions, with most actively participating throughout the four-week intervention period.

These findings emphasize the effectiveness of integrated health education and physical activity interventions in enhancing elderly health literacy and self-care behaviors. The improvement in post-test knowledge scores suggests that interactive counseling delivered with visual aids and guided discussions effectively enhances comprehension among older adults, even in populations with limited formal education. This aligns with findings from Wahyuni et al. [36], who reported that participatory counseling and the use of visual materials improved understanding and retention among elderly participants in Jakarta's community health programs.

In addition to knowledge gains, physiological assessments revealed concerning baseline health risks: 76% of the participants presented with elevated blood pressure (>130/80 mmHg), and 58% exhibited abnormal blood glucose levels, indicating a high prevalence of hypertension and potential diabetes. However, after the intervention, several participants reported better self-monitoring and improved awareness regarding dietary habits, suggesting behavioral changes towards healthier lifestyles. These outcomes correspond with the results of Fitri et al. [37], who found that combining physical activity and health counseling in elderly programs led to measurable improvements in blood pressure control and health awareness.

The high participation rate also demonstrates the feasibility of using elderly gymnastics as a preventive strategy against degenerative conditions. Elderly gymnastics enhances cardiovascular fitness, joint flexibility, and neuromuscular coordination, which collectively contribute to improved mobility and cognitive performance [38]. Moreover, this type of low-impact exercise promotes social interaction and psychological well-being factors that play a critical role in maintaining cognitive health and reducing dementia risk [39]

B. COMPARISON WITH SIMILAR STUDIESZ

National and international research emphasizing the benefits of community-based interventions for older adults. A study by Kim and Park [40] demonstrated that structured exercise combined with health education significantly improved cognitive and emotional health among Korean elderly populations. Similarly, in Malaysia, Rahman et al. [41] found that regular participation in elderly gymnastics correlated with enhanced mental alertness, reduced depressive symptoms, and improved sleep quality outcomes also observed informally in this project through qualitative participant feedback.

In the Indonesian context, Budiarti and Nora [42] reported that brain gymnastics led to measurable cognitive improvements among elderly individuals with early-stage dementia. Although the Bulak Village program focused on physical rather than brain-specific exercises, the physiological and cognitive benefits remain consistent. Both interventions support the hypothesis that regular, guided movement exercises can mitigate age-related cognitive decline.

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Furthermore, this study reinforces the findings of Putra and Suharjana [43], who developed an elderly exercise model to improve physical fitness and brain function. Their research highlighted that group-based exercise sessions increased motivation and consistency two critical factors mirrored in this community service program, where collective participation fostered encouragement among peers.

However, compared with other interventions that utilized digital platforms or telehealth for elderly engagement [44], the Bulak Village program maintained a face-to-face, low-technology approach, which proved more suitable for elderly individuals with limited digital literacy. While technology-assisted programs have shown effectiveness in urban areas, the direct interpersonal model used in this study demonstrated stronger community bonding and higher attendance rates.

Another distinguishing aspect of this project lies in the integration of multidisciplinary collaboration involving nursing, nutrition, and electromedical students alongside health cadres. This cross-disciplinary approach not only facilitated holistic elderly care but also strengthened the operational capacity of local cadres an advantage rarely reported in previous studies. Research by Diarthini et al. [45] also found that personal engagement between healthcare providers and elderly participants significantly enhanced health outcomes, suggesting that sustained, direct involvement is essential for long-term program success.

Collectively, these comparisons confirm that the combination of educational, behavioral, and physical interventions delivered through participatory community engagement can effectively improve both the physical and psychological well-being of older adults. Nonetheless, the current program's design, focusing on local empowerment and face-to-face methods, uniquely addresses the contextual needs of low-income elderly populations in Surabaya.

C. LIMITATIONS, WEAKNESSES, AND IMPLICATIONS

Although the study yielded positive results, several limitations must be acknowledged. First, the absence of a control group restricts the ability to establish definitive causal relationships between the intervention and outcomes. While pre- and post-test comparisons provide evidence of improvement, other external factors such as participants' personal motivation, family support, or concurrent health initiatives may have influenced the results. Future research should incorporate control groups or randomized designs to strengthen validity [46].

Second, the sample size (n=40) was relatively small and specific to a single community, limiting generalizability to broader elderly populations across Indonesia. Larger-scale studies with diverse demographic characteristics are required to confirm replicability. Similar studies in other provinces, such as Central Java and West Nusa Tenggara, have reported variations in elderly participation and baseline health profiles, emphasizing the influence of sociocultural differences on program success [47].

Third, the duration of the intervention approximately four weeks was relatively short to evaluate long-term physiological or behavioral changes. Previous longitudinal research, such as that by Nurdianningrum and Purwoko [48], indicated that significant improvements in sleep quality and blood pressure regulation among elderly participants typically emerge after eight to twelve weeks of consistent exercise. Therefore, future programs should consider extending the implementation period to assess sustained impact.

Fourth, while the study evaluated basic physiological parameters (blood pressure, glucose, cholesterol, BMI), it did not include cognitive or emotional assessment tools, such as the Mini-Mental State Examination (MMSE) or Geriatric Depression Scale (GDS), which could provide more comprehensive insight into the effects of physical exercise on mental health. Integration of such instruments would enhance understanding of the holistic benefits of elderly gymnastics.

Despite these limitations, the implications of this study are highly relevant for public health policy and community health practice. The outcomes highlight the feasibility of implementing low-cost, replicable health promotion models within existing Posyandu Lansia networks. By leveraging community resources and multidisciplinary collaboration, similar programs can be scaled up to other urban and rural areas.

Furthermore, the study underscores the critical role of health cadres as local agents of change. Training cadres in effective communication, health screening, and exercise facilitation ensures program continuity and sustainability beyond the involvement of academic institutions. This aligns with findings from Hanifah et al. [49], who emphasized that empowering local health volunteers enhances long-term community engagement and reduces dependency on external support.

In terms of public health implications, the findings suggest that preventive interventions focusing on physical activity and education are more cost-effective than curative medical treatments for degenerative diseases in the elderly. Policymakers should therefore prioritize integrating similar programs into national aging and health promotion frameworks. Moreover, continuous monitoring through health centers (Puskesmas) is essential to detect early signs of degenerative diseases and encourage timely intervention.

Finally, the study contributes to academic development by providing a practical model of community-based participatory service that bridges educational institutions and society. Students' involvement in counseling and data collection not only enriched their professional competencies but also strengthened community-university relationships a vital component of the Tri Dharma Perguruan Tinggi (Three Pillars of Higher Education).

In conclusion, this discussion confirms that the integrated model combining education, physical activity, and local empowerment offers a viable solution for improving elderly health literacy, physical performance, and social engagement. Future community programs should adopt longer-term, multi-site, and multidisciplinary frameworks while incorporating rigorous evaluation metrics to ensure scalability and sustainability.

VI. CONCLUSION

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The primary aim of this community service program was to enhance the independence and well-being of elderly individuals in Bulak Village, Surabaya, through the implementation of integrated preventive strategies combining health education, nutritional counseling, health screening, and elderly gymnastics. The intervention sought to increase awareness of degenerative diseases and encourage behavioral changes that promote healthy aging. The findings indicate that the program successfully achieved its objectives, as evidenced by a significant improvement in participants' knowledge and engagement levels. Quantitative evaluations showed that 90% of the elderly participants demonstrated improved understanding of degenerative diseases and their prevention following the counseling sessions.

Moreover, health screening results revealed that 76% of participants initially presented with elevated blood pressure values (>130/80 mmHg) and 58% exhibited abnormal blood glucose levels, indicating substantial baseline risks that required intervention. Through routine gymnastics and education, participants exhibited noticeable enthusiasm and reported improved physical comfort and social interaction, confirming the feasibility and acceptance of this approach within a community setting.

The multidisciplinary collaboration involving nursing, nutrition, and electromedical students also contributed to the program's success, strengthening local health cadres' capacity to support ongoing elderly health initiatives. Despite these achievements, the study recognizes certain limitations, including its short duration, limited sample size, and absence of a control group. Therefore, future community service and research efforts should adopt larger, multi-site, and longitudinal designs to assess long-term behavioral and physiological outcomes. Further integration of cognitive and psychological evaluation tools such as memory assessments and quality-of-life indices would also enrich data on mental well-being improvements.

Strengthening partnerships between academic institutions, community health centers, and local governments is essential to ensure program sustainability. Overall, this study demonstrates that structured education and physical activity interventions are effective, low-cost approaches to improving elderly health literacy, preventing degenerative diseases, and promoting active, independent aging within Indonesian communities.

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DATA AVAILABILITY

The data supporting the findings of this study are available from the corresponding author upon reasonable request. All datasets generated and analyzed during the community service program were collected in accordance with institutional guidelines and are stored securely at the Poltekkes Kemenkes Surabaya.

AUTHOR CONTRIBUTION

All authors contributed equally to the conception, design, implementation, data collection, analysis, and manuscript preparation of this community service program. Bedjo Utomo supervised the overall project execution, Liliek Soetjiatie coordinated health education and community engagement, Heru Sulistijono managed nutritional assessment and counseling, and Nurul Hindaryani contributed to data analysis and manuscript editing. All authors have reviewed and approved the final version of the manuscript.

DECLARATIONS

ETHICAL APPROVAL

This community service activity was reviewed and approved by the Ethics Committee of Poltekkes Kemenkes Surabaya.

CONSENT FOR PUBLICATION PARTICIPANTS.

All participants involved in this community service program provided informed consent prior to participation. They were fully informed about the objectives, procedures, and potential benefits of the activities. Consent for the use of collected data, photographs, and summarized findings for publication purposes was obtained voluntarily from all participants.

COMPETING INTERESTS

The authors declare that there are no competing interests or potential conflicts of interest related to the conduct of this community service program or the publication of this article.

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