

# Process evaluation of a national elderly nutrition care program in Iran: Perspectives of clients and providers

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## Research article

**Keywords:** Process evaluation, elderly, Nutrition, Elderly Integrated Care Program, National, Iran

**Posted Date:** March 2nd, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-15641/v1>

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**Version of Record:** A version of this preprint was published at Risk Management and Healthcare Policy on August 1st, 2020. See the published version at <https://doi.org/10.2147/RMHP.S261121>.

# Abstract

**Background** The rapid growth of Iran elderly population highlights the importance of more attention to nutritional needs of this age group. Process evaluation study on the nutritional part of the national Elderly-Integrated Care Program was conducted to examine degree of exposure and satisfaction of the targets with the program components, and assess the reach, delivery, fidelity, and external contexts of the program.

**Methods** To evaluate perspectives of clients on elderly integrated nutrition care program (EINCP) implementation process, a self-administrated questionnaire was constructed, validated, and applied to 256 individuals with the age of above 60 years attending the program at 57 health care centers of Tabriz metropolitan area of East Azerbaijan province in Iran using convenience sampling method. Another valid questionnaire was also applied to investigate viewpoint of the perceptions of 76 staffs of these health care centers as the program providers around the EINCP.

**Results** The reach rate of the clients was reported 20.0%. Delivery of the educational components to entire program providers was accomplished (100.0%); however, the delivery of some parts of the program to the clients had some main weaknesses. The fidelity of the program tools was considered inadequate from perspectives of both clients and providers. 77.5% of the clients had exposure to the program. Clients' satisfaction rate was varied from 4.2 to 34.7% with various available services, but 42.8% of the clients had high satisfaction with overall parts of the EINCP. The program also suffered from some external contexts such as the lack of financial support of program providers.

**Conclusion** The format of the EINCP and strategies related to recruitment of the clients should be improved in order to minimize the barriers highlighted in this study. The providers should focus on raising the compliance of clients to receive a higher reach rate. It is suggested that program planners add periodic monitoring and evaluation of the program.

## Background

Aging of population is considered as one of the most important social transformations in current century, which can significantly affect every nation's health, social, and economic levels (1). Old age refers to age of over 65 years in the developed countries, and more than 60 years in the most of the developing countries (2). Worldwide, the population of the elderly is increasing rapidly, as 1 in 11 individuals has categorized in old age group (3). According to the World Health Organization (WHO) estimation, elderly population will rise to 2 billion by 2050 (4). It was reported that 23.1% of the total disease burden was attributed to elderly disorders, as the burden of elderly diseases in high-income countries, and low and middle-income countries is estimated as 49.2% and 19.9%, respectively (5). Non-communicable chronic diseases (NCDs), as a common condition associated with aging, can profoundly impact medical management, health care use, quality of life, morbidity and mortality in the world, attributable largely to poor nutrition and suboptimal lifestyle behaviors (6).

Most of the developed countries have made many efforts to modify their current age structures. They documented interplay between aging, NCDs, and socioeconomic outcomes (7), then they applied a harmonized approach to tackle the aging issue. The effective partnership between government, private sections, and international organizations help the developed countries to increase the quality of life and decrease or prevent the disabilities among this age group, consequently resulting in the healthier elderly population as well as decreasing dependency and health costs in their countries (8). Prevention of high burden of cost to every government's body and health promotion among elderly can be achieved by dedicated population approaches to diet and physical activity through using the public services (9). Although there are different types of national elderly nutrition strategies in the developed countries (10–14), the developing nations are still struggling, indicating a substantial need for formulation and appropriate policies to improve elderly health care section especially in developing nations.

Elderly population of Iran is growing faster than it did in the Western countries; currently, 1 of 10 people in the country is older than 60 years. It was predicted that in only 35 years, this proportion will have increased to around 1 in 3 (15). In 1980, Iran developed primary health care (PHC) (16, 17). Today, the PHC in Iran has many achievements and various successes in promoting health indexes (18). Despite these achievements, the country is facing emerging challenges related to demographic transition including population aging, changes in people needs, the unsustainability of resources, and hospital-centered health services (19, 20). Therefore, these factors bring about an urgent need to accentuate elderly health needs in Iran. The ministry of Health and Medical Education (MOHME), responsible for elderly health care, run some comprehensive programs such as Elderly Integrated Care Program (EICP), with high focus on nutrition needs (21). In 2006, the government started implementation of the EICP targeting elderly attending health care centers in both urban and rural sections. The pilots of this program were run in four provinces of Iran including Fars, Ardabil, Lorestan, and Kermanshah. After this pilot implementation, the program was spread to other cities of the country (22). According to the report of statistical center of Iran, East Azerbaijan is one of the provinces with high percentage of elderly population (7.1%) compared with other provinces in Iran (23). In 2014, the EICP was implemented in Tabriz metropolis (capital of East Azerbaijan province) located in the northwest of Iran. According to the latest public population census of Iran in 2016, Tabriz population was 1,558,693, among whom 108,184 (11.56%) were elderly (24).

## **Overview of Elderly Integrated Care Program**

The EICP is a part of first level health service program in the country. The goal of this health program is to improve health of people, decrease the public health costs and boost social protection. The objectives of this program are community empowerment, community health care, and priority of prevention over treatment, priority of outpatient treatment over inpatient treatment, and not providing duplicate services at different levels of care and treatment. All the age groups of community are targeted by this program, and there are many listed strategies and activities for each group. According to the EICP, the providers have to firstly prevent the diseases with active care and secondly, provide special care for needed people based on the guidelines and available resources. This program focuses on various health dimensions of elderly

including lifestyle, nutritional situation, physical activity, mental disorders, and chronic disorders such as hypertension, diabetes, lipid profile, osteoporosis, as well as smoking, vaccination, dental health, and high risk behaviors. The activities are specified by seven strategies including periodic assessment, classification of clients, prevention and therapeutic care, public health education, health consultation, required follow-up, and referral to upper health care center (Table 1).

The nutritional components of EINCP are shown in Fig. 1. The staffs also have the task of making telephone calls to the elderly and inviting them to visit their local health care center after explaining the goals of running program. After the attendance of an old individual to health care center and opening a personal health file, he/she can benefit from the provided nutritional services.

After running EINCP for 4 years, there is a substantial need to deeply evaluate the implementation dimensions, depth, and consequences of the program, aiming at to making a revision in the process levels of the program. Here is the report on the process evaluation of the EINCP from perspectives of both clients and providers, contributing to the clarification of both strength and weakness of the program.

## **Methods**

### **Field of study and Participants**

This cross-sectional study was conducted in Tabriz city from February to June, 2019. The city is divided into 10 municipal areas, which totally have 57 health care centers. The subjects eligible to participate in the study were invited from all of the identified health care centers using convenience sampling method. Collectively, 256 individuals with the age of 60 years or above were recruited from these centers using simple randomization tables. Additionally, 76 health staffs including the nurses, nutritionists, and doctors from these health centers were invited to participate in the study. All the participants signed an informed consent. After declaring their enthusiasm to cooperate, participants were administered with the face to face questionnaires. In case the patient was not capable of remembering well, information was obtained from his/her relatives depending upon the request by patient, and the response was recorded after getting the patient's approval. The protocol was approved by the ethical committee of Tabriz University of Medical Sciences, Tabriz, Iran (reference number: IR.TBZMED.REC.1397.1018).

### **Design and Process evaluation components**

The process evaluation of any program has five key theoretical elements as follows: 1) Exposure; demonstrating the initial awareness of the target people to the program components, 2) Reach; showing the proportion of the subjects utilizing the program, 3) Satisfaction; examining the satisfaction status of participants with the components of the program, 4) Delivery; assessing whether all the program components are being implemented as intended, and 5) Context; the effective external and environmental factors that may influence aspects of the program implementation or outcomes (25–27).

Both quantitative and qualitative information were collected from participants. Figure 2 shows the process of data collecting throughout the whole research period. Both elderly (clients) and staffs' (providers) groups evaluated the running program using two separate self-administered questionnaires. The used elements of process evaluation were translated into structured questions to develop the study questionnaires (28–30). At the next stage, a panel of experts specialized in the field of gerontology (n = 2), nutrition (n = 3), health policy (n = 2), and health education (n = 3) investigated the validity of tools. Based on the experts' opinions, content validity index (CVI) and content validity ratio (CVR) of both questionnaires were calculated; the CVR of the providers and clients' instruments were 0.93 and 0.79, respectively. According to the Lawshe table, an acceptable CVR for a ten-expert panel is 0.68 (31); therefore, the CVR of the both study questionnaires were considered acceptable. Based on Polit and Beck suggestion, the acceptable lower limit of CVI is 0.80 (32). Accordingly, the CVI of scales were also acceptable as the providers and clients' questionnaires had the CVI rate of 0.89 and 0.88, respectively. Besides, the reliability of the scales obtained through filling the questionnaires by 36 eligible individuals and 7 health staffs. After four weeks, the retest of questionnaires was done using the same participants. The final Cronbach's  $\alpha$  of the providers and clients' scales were 0.89 and 0.83, respectively, as the rate higher than 0.70 is considerable (33). The Interclass Correlation Coefficient (ICC) of the questionnaires was also checked to ensure the reliability of study instruments, considering the coefficients above 0.70 as significant (34). The ICC for providers and clients' instruments were 0.83 and 0.80, respectively. Finally, two questionnaires were used to process evaluation of the running program. The final questionnaires consisted of the elements to investigate satisfaction of both clients and providers with the various components of the program, delivery of the program, reach, and exposure of the clients to the program components, fidelity of program tools, and also the contextual factors affecting the implementation of the program.

## Data analysis

All the responses of participants to open questions were transcribed. Two researchers independently categorized answers to open questions in order to identify the relevant themes, then organized them by topic, and summarized. Disagreement between the reviewers was resolved through consulting with a third reviewer. The variables of questionnaires were represented by mean  $\pm$  standard deviation (SD) or number (percent). The correlation between qualitative and quantitative variables was obtained using Kendall's tau-b correlation test. The descriptive statistics of quantitative data was obtained using statistical package SPSS (version20.0).

## Results

### Characteristics of study participants

A total of 256 clients including 104 men and 152 women were participated in the current study. The mean  $\pm$  SD age of them was  $64.66 \pm 3.92$  years. 89.8% of the clients had not any academic education and

nearly all of them (97.3%) were married. The full questionnaire response rate was 92.19% (n = 236 of 256 clients).

A total of 76 program providers with mean  $\pm$  SD age of  $38.64 \pm 5.80$  years also filled the providers' questionnaires and nearly all of them (n = 73) were females.

## **General perspective of the participants to the program**

The reach rate was obtained by the number of elderly people undergone the first evaluation, divided by the number of potentially eligible elderly persons. On 9 November 2019, from 168,744 old individuals identified by statistical center, the health care centers provided nutrition screening to 33,789 of them and they benefited from the provided nutritional services in these centers. Then, it can be reported that the reach rate of the elderly integrated nutrition care program (EINCP) was 20.0% in Tabriz city.

The program agenda demonstrated that the justification meeting of the providers should be implemented 4 times a year. In this sense, the process evaluation showed that these meeting sessions were held timely and sufficiently by the provider centers. The components of the EINCP (Table 1) were presented correctly to entire providers (100.0%), who had to pass the final test given by the provider centers.

Among the elderly participated in the study, 95.3% were under supervision of a health care center and had a private health file. Table 2 shows the perspectives of clients toward the EINCP. Of the responders visiting the health care centers for at least once, 77.5% had exposure to the provided nutritional services by EINCP, which had not yet reached to the program target (Target exposure = 90%). 86% of the clients believed that the nutritional services of the centers were sufficient. Although 86.8% of the clients believed that the providers gave them enough time to provide their health needs; however, just 58.5% of the clients were fully satisfied of providers' functions. 75.0% of them also stated that the number of providers and their field of expertise were not sufficient enough to help elderly, particularly on weight and blood pressure measurements.

All the participated program providers in the study were picked up the principles of the nutritional care interventions and tried to carry them out in the manner that was intended, as well as most of them (94.7%) were motivated to their assigned tasks. The fidelity of intervention components and tools were not considered adequately useful from the providers' perspectives, as some of them (39.3%) believed that most of the referral elderly did not benefit from these services.

## **Determinants of compliance**

In current study, the number of nutritional care sessions that an old individual benefited from health care center was considered as the compliance rate. If an elderly individual had benefited from the provided services of EINCP for two or more times in recent year, it would have been considered as a good compliance. The overall compliance rate was 33.5%, negatively associated with the age of the participants ( $r=-0.224$ ,  $p < 0.001$ ).

## **Face-to-face nutrition education meeting**

According to the EINCP, an old subject with any nutrition-related disorder should be referring to a nutritionist in a nearby health care center. The nutritionists are responsible for assessing the nutritional status of the referred subjects and giving appropriate face-to-face nutrition education to them. Of the clients, 16.1% (n = 38) reported that the face-to-face nutrition education meeting was not delivered. The rest benefited from one (21.2%), two (29.2%) or more than three (33.5%) sessions. Depending on the individual's condition, the needed time for nutritionist to involve in the process of education meeting ranges from 20 to 40 minutes (16). 83.3% of the clients attending these sessions reported that the duration of face-to-face nutrition education meeting was lower than 20 minutes, so not sufficient for them. Nearly half of the clients (50.2%) referring to this service had long wait time complaints to visit the nutritionists. Although, most of the clients (92.4%) stated that the nutritionists were motivated to their face-to-face education task, just 30.6% of the referred clients had high satisfaction with this service.

Same as the clients, 84.8% of the providers reported that the duration of each nutrition meeting was less than 20 minutes. Table 3 shows the barriers on implementation of EINCP from the providers' perspectives. 77.6% of the providers stated that the limited time of face-to-face nutrition education meeting was due to the high referrals, as none of them had not enough time to devote to all the clients. They also reported that the elderly individuals disregarded from the education service.

As seen in Table 3, many factors were contributed to low adherence of clients to this education service. Nutritionists, as the program providers, complained of a high diversity of health care centers' clients as they could not pay enough attention to the elderly. On the other hand, 78.9% of them believed that some early caregivers did not properly assess the health status of the clients and did not pay enough attention to convince the elderly in the need of nutrition education to refer to the nutritionist. 76.3% of the providers had not an appropriate space for face-to-face education and 67.1% of them were not stationed nutritionists in a specific health care center that greatly affected adherence of clients to face-to-face nutrition education meetings. As well as, 89.4% of the providers believed that the elderly clients preferred to use available health services in specialized clinics instead health care centers.

## **Group Nutrition education sessions**

According to the EINCP, elderly group nutrition education sessions should be conducted once a week at a specific place and time in each health care center and also in other public places such as mosques and parks. The providers must transfer appropriate and useful information about nutrition to the clients, using group discussions. The suggested duration and participants of these classes were 60–70 minutes and 11–20 persons, respectively. Every client had to participate in three specified periodic sessions. The package of instructions for elderly group nutrition education sessions is shown in Table 4. Based on the EINCP, 90% of the covered elderly in health care centers should benefit from these sessions.

As shown in Table 2, just 7.6% of the clients reported that they had participated in all three sessions of group nutrition education program, though 87.3% of the clients were exposed to these sessions. Of the participated clients in the sessions, 21.6% stated that the number of participants in these group sessions was more than 11. Most of the clients (86.0%) reported that the duration of the sessions were lower than

an hour that due to the program, this duration was considered inadequate. 37.7% of the clients reported that these sessions were not conducted regularly. 95.4% of the clients reported that the contents of group nutrition education sessions were simple, understandable and attractive. 43.6% of the clients stated that these sessions were also conducted in public places such as parks and mosques. The responders (97.0%) stated that the providers had high motivation to providing these group education sessions.

The providers were enthusiastic about the elderly group nutrition education sessions; 32.9% of the providers had not enough time for fulfilling their assigned tasks, as they provided health care services to other age groups at the same time. 52.6% of the providers pointed out that the lack of elderly attendance and their low motivation in these sessions led to disturbing timely and weekly formation of the sessions. Furthermore, lack of a separate educating room, inability of the clients to alone attendance to the health care centers, and low literacy of the clients were other barriers that affected adherence of clients to group nutrition education sessions.

## **Physical activity sessions**

The EINCP has specified that 60% of the covered elderly should participate in physical activity sessions in recent year. It was shown that 59.7% of the clients did not participate in any physical activity sessions, since 73.7% of the individuals reported that they did not have enough motivation to participate in the sessions. As a result, just 3.0% of the clients receive the physical activity session as the program planned. The exposure rate of the clients to these sessions was 79.2%. Only 5.5% of the participants stated that the physical activity sessions were conducted periodically; however the conducted sessions were later than the due time or in unstable place. The time duration of every physical activity session should be 45–60 minutes, while 55.2% of the clients stated this duration were observed in the sessions. 42.2% of them also stated that the participated elderly in the session were more than 10 individuals (target of the program). Although, almost all the responders (94.2%) stated that the forms and intensity of the physical activity practices were matched to their ability, just 13.2% of the clients had high satisfaction with these sessions.

The providers believed that the low adherence of clients to physical activity sessions was due to the inefficient information system, and weather conditions. They also pointed out the low motivation of the clients to these sessions.

## **Notification framework for the elderly**

The health staffs of the health care centers are responsible for regularly informing the elderly about the running programs of the centers by telephone contacts. Most of the elderly (87.3%) stated that they had received telephone calls from health care centers with the content of inviting them to use the health services of the centers. Telephone (59.3%) and social connections (27.2%) were the most frequently used methods to inform the participants on the nutritional services of the centers.

The providers stated that some barriers can greatly affect their telephone contacts. 32.9% of the providers were failure to respond by the clients in the last year. 96.0% of the providers had not enough time, as well

as 80.3% of them reported that presence of one phone line in the health care center disturbed their assigned task.

## **Program follow-ups**

The providers should provide monthly follow-ups for elderly who had a special need and once in a year for elderly without any disorders. 24.0% of the clients had monthly follow ups and 72.5% of them were satisfied with the follow ups' process. Regular body weight and blood pressure monitoring is another task of the health staffs in the centers. It was reported that 40.7% of the clients had regularly sessions of checking body weight or blood pressure; however, 8.9% of the responders had never received these sessions. 65.3% of the clients were not fully satisfied with weight and blood pressure monitoring sessions.

Nearly half of the providers stated that they followed up the health status of the clients once in three months, when they went to health care centers to receive their supplements.

## **Posters, banners, and pamphlets**

According to the EINCP, health care centers should assemble banners and posters with the content of community health services at every neighborhood. The health staffs should also give nutrition and physical activity-related pamphlets and use the educational tools in consultation sessions to individuals referring to the health care centers. Most of the clients (81.3%) did not notice the presence of these posters or banners at their neighborhoods. Nearly 60% of the clients received nutrition and physical activity-related pamphlets in the classes. Further, 84.1% of the clients mentioned that the received pamphlets were useful.

77.6% of the program providers expressed that the pamphlets were not delivered on time and in sufficient quantities to them, resulting in low delivery of them to the clients. They also stated that low literacy of the clients was contributed to disturbed this service. The entire providers thought that the fidelity of these educational tools was not adequate. They stated that banners' shapes and colors were not attractive enough to attract clients' attention. They also suggested designing the banners and pamphlets with more conceptual colors and shapes, suitable for all the elderly population especially illiterate individuals.

## **Vitamin and mineral supplementation**

The EINCP has recommended health care centers to give free vitamin D supplements (50,000 IU/month) and calcium supplements (500 mg/day) to all of the elderly after examination of a general practitioner. These centers should also give daily multi-vitamin supplements to the elderly who have BMI < 22 kg/m<sup>2</sup>. In this regard, just 24.7% of the clients had received vitamin D supplements, more than two pearls in recent year. 4.2% of the clients had high satisfaction with supplementation service. None of the clients had received free calcium or multi-vitamin supplements.

80.3% of the providers reported that the clients had not refer to them to take the supplements, then 81.6% of them stated that they gave supplements to a member of the elderly family (if the elderly could not

come to the center). All the providers stated that the health care centers had not adequate financial support from the provider centers to prepare the supplements.

## **Overall contextual aspects affecting the program**

Almost all of the participated providers believed that the main reasons for the shortcomings in providing the high quality and sufficient nutritional services to the clients were the non-payment of staff salaries on the due time, as well as the heavy workload assigned to them. Generally, since all the staffs at health care centers including general practitioners, health care providers, nutritionists and psychologists provide services for various age groups at a limited time, it is not possible to focus on just the elderly. They had believed that due to the higher need of children and pregnant women, they should devote most part of their time to these two groups, leaving them without enough time to optimal care for the elderly. Many health care centers had limited space to provide services, hindering them to respond simultaneously to the large number of people visiting the centers. Interestingly, 65.2% of the clients stated that they were faced to hard availability of the health care centers and incompatibility of services with their needs (34.8%).

## **Discussion**

The present study evaluated the process of EINCP implementation in Tabriz city, Iran. The study demonstrated that overall compliance rate of clients to the program was 33.5%, negatively associated with the age of them. The reach rate of the program EINCP was 20.0%. Although the delivery of the educational components to entire program providers (100.0%) was done, delivery of some part of the program to the clients had some main weaknesses. The fidelity of program tools was considered inadequate from perspectives of both clients and providers. 77.5% of the clients had exposure to the provided services by EINCP in the health care centers. The satisfaction rate of the clients with various services of EINCP was varied; however 42.8% of them had high satisfaction with the program.

The results of current process evaluation showed that one of the main problems with this program was inadequate and irregular attendance of clients. The reported reach rate of the evaluated program (20.0%) was considered as a low level reach rate. In another study, the reach rate of a health program on Brazilian elderly was reported 17.2% (35). The low reach of existing programs has made the policy makers worried. Low reach rate of the elderly to the national programs has also been reported in other health-related intervention programs (36, 37). Older persons were usually less compliant with prescribed medication as compared to younger individuals (38, 39). In a recent study, low reach rate of the clients to nutrition education and physical activity sessions was largely due to the inadequate supervision of trainer or coach to the activities of the participating clients (40). In current study, some of the clients stated that the prescribed physical activities were not suitable for their health conditions and they sometimes experienced difficulties carrying out them. In addition, they believed that the contents of education sessions were poor and did not meet the need of participants. On the other hand, the participants' perceptions of the presentation of the educational and physical activity sessions showed that they were not informative and interesting enough, as 73.3% of the clients stated that they were unwilling to

participate in the sessions due to their low motivation. Thus, it is suggested that customized support for each old individual should be taken into consideration in order to promote the presence of older adults in education and physical activity sessions of the health care centers. The low availability of health care centers to the elderly was another factor affecting the reach of the EINCP, as 65.2% of them complained of this issue. The availability of the locally accessible programs with a quick and easy access for all the target individuals are one of the main strategies helping the providers to get closer to the desired outcomes (41). Then, the policy makers should design efficient programs to ensure that participants actually follow the intervention and the program would gain an optimized compliance.

The delivery of the early parts of the program to the providers was reported as 100.0%. The educational and briefing sessions to the providers were formed as planned. Against high delivery rate of the program to the providers, the delivery of the program to the clients had some shortcomings in most parts of the planned program. The follow-up sessions, number and duration of nutrition education and physical activity sessions, and vitamin or mineral supplementation did not go on as had been planned. In disagreement of current study, the process evaluation of two studies in Nigeria and USA has shown the delivery rate of 100% (42, 43). Several factors may have contributed to low level of delivery in current study; most of the providers reported that they had not enough time to dedicate on EINCP as they had other tasks in the health care centers. The lack of timely and adequate administration of educational pamphlets, vitamin D, calcium, and multi-vitamin supplements by the provider centers also prevented providers from providing adequate tools and supplements to the clients. We speculate that the lack of attention to providers' specialties, the lack of their time, and poor delivery of the program components might result in diminished EINCP effects, as confirmed by another study (44).

Although all of the clients were familiar with the health care centers of their resident area, 22.5% of them had not exposure to the EINCP. In this study, the dominant strategy to inform the elderly about the EINCP was telephone calls; however the results showed that it did not sufficiently raise the awareness of the target group. The clients interacting more with health services seemed to be more exposed to information about EINCP. There was also no comprehensive information on the nutritional services provided to the elderly i.e. many people knew the health centers as a place to provide brief services to children and pregnant women. Raising awareness of target group about their needs is a key plank of the public health approach to health care (45). It is suggested that the program providers should invest on raising the residents' awareness about the EINCP in health care centers by using appropriate methods.

Although 42.8% and 58.5% of the clients were satisfied with the providers' performances and overall available services of EINCP, respectively, there were still some shortcomings in some fields including education and physical activity sessions, as well as supplementation and follow-ups. A high percentage of the providers were adequately motivated to their assigned tasks; however, they reported many barriers related to the program. In current study, a review of electronic health accounts of the clients has shown that although there were standard forms for assessing the nutritional status of old people including Mini Nutritional Assessment questionnaire, the providers did not complete forms correctly, as many of them did not receive enough training in this field and had not adequate time. It is better to health centers use

senior-educated staffs with high experience in the field. It is also recommended to employ more related staffs to meet the needs of the elderly.

The efficiency of a health program is largely dependent on how the strategies are implemented according to the rules established by the program agenda. In practice, overlooking the adopted strategies and the services recommended by the initial plan through runners of a program, causes disruption to the program. According to the findings of the current study, delivery, fidelity, and reach of the program were not implemented as preplanned.

## **Conclusion**

The high exposure of the clients to the EINCP and good delivery of early parts of the program to the providers were the strengths of the running EINCP. However, there were also some key weaknesses in most of the operational divisions of the EINCP i.e. poor reach of the program, contextual factors and barriers with program fidelity and delivery resulted in diminished program effects. The providers should focus on raising the compliance of clients to receive a higher reach rate. It is suggested that program planners add periodic monitoring and evaluation of various parts of the program throughout the EINCP. To achieve a better implementation of the program, there is need to focus on some essential functions including financial support of the program providers and investment on raising awareness of elderly and their families at the macro level, as well as continuous training of providers upon the beginning of the intervention. The format of the EINCP and strategies related to recruitment of the target population should be improved in order to minimize the barriers highlighted in this study. Findings from this study can help policy makers and health practitioners develop better approaches to promote the implementation of nutritional care programs for elderly at primary health care level.

## **Declarations**

### **Ethics approval and consent to participate**

The informed consent obtained from study participants was written. The protocol was approved by the ethical committee of Tabriz University of Medical Sciences, Tabriz, Iran (reference number: IR.TBZMED.REC.1397.1018).

### **Consent for publication**

Not applicable for the current analysis.

### **Availability of data and materials**

The dataset used and analyzed during the current study are available from the corresponding author on reasonable request.

### **Competing interests**

The authors reported no conflict of interest.

## Funding

This study was supported by a financial assistance from the Tabriz University of Medical Sciences, Tabriz, Iran. This funding organization is responsible in the process of data collection, analysis, and interpretation and in writing the manuscript.

## Authors' contributions

MA and EF developed a hypothesis, EF and SK searched the literature, reviewed the relevant articles. MA and RKZ provided methodological advice. SK and EF analyzed the data, interpreted the findings, and wrote a manuscript. All authors have read and approved the manuscript.

## Acknowledgements

The results of this article are derived from the Ph.D. thesis of the first author, registered at Tabriz University of Medical Sciences, Tabriz, Iran.

## Abbreviations

EICP: Elderly Integrated Care Program; EINCP: Elderly Integrated Nutrition Care program; NCDs: Non-communicable diseases.

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## Tables

**Table 1. Explanation of nutritional components of elderly-integrated care program in Iran**

<b>Strategy</b>	<b>Action</b>
<b>Periodic assessment</b>	Investigation of family history of diseases Investigation of health risk factors Investigation of lifestyle situation Assessment of nutrition status Assessment of drug history
<b>Classification of clients</b>	Apparently healthy elderly At risk elderly Diseased individuals
<b>Prevention and therapeutic care</b>	Supplementation (Vitamin D and calcium supplementation for all clients, multi vitamin supplements for elderly with BMI<22) Prescription of other drugs and supplementation according to the state licenses
<b>Public health education</b>	Providing recommendations and tutorials using the training packages Education on healthy lifestyle, disease symptoms fields (unhealthy foods, low physical activity, smoking, high risk behaviors, and etc.) Education of elderly and their family about prevention of disease and self-management activities and correct methods of drug taking Reforming social misconceptions Group counseling
<b>Health consultation</b>	Individual counseling and providing diet programs
<b>Required follow-up</b>	Follow-up the patient health and care status Follow- up the status of service presentation to elderly by telephone calls
<b>Referral to upper health centers</b>	Referral the elderly to higher therapeutic levels Record the taken actions in the patient's file

**Table 2. Process evaluation of “elderly integrated nutrition care program” (Clients’ perspectives, n=236)**

		<b>Frequency</b>	<b>Percent</b>	<b>Target</b>
<b>Reach</b>				
<b>Visiting sessions of clients to the health care center to receive any type of available services (not only nutritional services) in the last year (visit number)</b>	One	51	18.6	At least one session
	Two	59	21.5	
	More than two	126	46.0	
<b>Clients’ follow- ups by telephone calls in the last year</b>	Yes	206	87.3	Yes=100%
	No	30	12.7	
<b>Attendance to the face-to-face nutrition education meetings in the last year (Number of sessions)</b>	Zero	38	16.1	Depending on the clients’ health status
	One	50	21.2	
	Two	69	29.2	
	More than two	79	33.5	
<b>Attendance to the group nutrition education sessions in the last year (Number of sessions)</b>	Zero	38	16.1	More than two
	One	117	49.6	
	Two	63	26.7	
	More than two	18	7.6	
<b>Attendance to physical activity sessions in the last year (Number of sessions)</b>	Zero	141	59.7	More than two
	One	70	29.7	
	Two	18	7.6	
	More than two	7	3.0	
<b>Attendance to body weight and blood pressure measurement service in the last year (Number of sessions)</b>	Never	21	8.9	At least one
	One	51	21.6	
	Two	68	28.8	
	More than two	96	40.7	
(Contd.)				
<b>Reasons for non-adherence to physical activity sessions</b>	Limited personal motivation	173	73.3	-
	Weak information system	37	15.7	
	Incompatibility	11	4.7	

	of services and clients' needs			
	Problem with access to venue	12	5.1	
	High travel expense	3	1.3	
<b>Reasons for non-adherence to nutrition care services</b>	Hard availability to health care center	58	65.2	-
	Incompatibility of services and clients' needs	31	34.8	

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**Exposure**

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<b>Clients' awareness on availability of nutrition care services at nearby health care center</b>	Yes	183	77.5	Yes= 90%
	No	53	22.5	
<b>Clients' awareness on the time and place of conducted group nutrition education sessions</b>	Yes	206	87.3	Yes= 90%
	No	30	12.7	
<b>Clients' awareness on the available physical activity sessions</b>	Yes	187	79.2	Yes= 90%
	No	49	20.8	
<b>Available information system</b>	TV or Radio	10	4.8	Mostly telephone calls
	Social connections	56	27.2	
	Telephone calls	122	59.3	
	Friends and neighbors	18	8.7	
<b>Clients' awareness on contents of posters or pamphlets</b>	Yes	156	66.1	Yes= 90%
	No	80	33.9	

(Contd.)

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**Delivery**

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<b>Open private health files for clients in the last year</b>	Yes	225	95.3	Yes= 100%
	No	11	4.7	
<b>Clients referral to upper health</b>	Yes	112	47.5	Depending on

(Contd.)

<b>centers in the last year</b>	No	124	52.5	the clients' health status
<b>Nutritional status follow-ups in the last year (Number of sessions)</b>	Zero	65	27.5	At least one
	One	16	6.8	
	Two	46	19.5	
	More than Two	109	46.2	
<b>Average session duration of every face-to-face nutrition education meeting (Minutes)</b>	<=20	165	83.3	20 to 40 minutes
	>20	22	16.7	
<b>Conducted group nutrition education sessions</b>	Weekly	127	53.8	Weekly=100%
	Monthly	98	41.5	
	Yearly	11	4.7	
<b>Conducted physical activity sessions</b>	Weekly	13	5.5	Weekly=100%
	Monthly	108	45.8	
	Yearly	23	9.7	
<b>Average session duration of every group nutrition education sessions (Minutes)</b>	<30	55	23.3	60 to 70 minutes
	30-60	148	62.7	
	>60	33	14.0	
<b>Clients' presence in every group nutrition education sessions (Number of participants)</b>	<4	33	14.0	11-20 persons
	5-10	152	64.4	
	>11	51	21.6	
(Contd.)				
<b>Regular group nutrition education sessions</b>	Yes	147	62.3	Yes= 100%
	No	89	37.7	
<b>Regular physical activity sessions</b>	Yes	70	73.7	Yes= 100%
	Later than the due time	17	17.9	
	Unstable place	8	8.4	
<b>Received nutrition-related pamphlets</b>	Yes	143	60.6	Yes= 100%
	No	93	39.4	
<b>Received physical activity-related pamphlets</b>	Yes	163	69.1	Yes= 100%
	No	73	30.9	

<b>Time duration of every physical activity sessions (Minutes)</b>	<45	39	26.9	45 to 60 minutes
	45-60	80	55.2	
	>60	26	17.9	
<b>Participated clients in every physical activity sessions (Number of participations)</b>	<5	16	11.3	>10 persons
	5-10	66	46.5	
	>10	60	42.2	
<b>Free vitamin D supplementation (50000IU/monthly) (Number of received pearls in last year)</b>	Zero	99	41.9	12 pearls
	One	27	11.4	
	Two	52	22.0	
	More than two	58	24.7	
<b>Free calcium supplementation (500mg/day)</b>	Yes	0	0	One/day
	No	256	100.0	
<b>Free multi-vitamin supplementation</b>	Yes	0	0	One/day (for elderly with BMI<22)
	No	256	100.0	
<b>Group nutrition education sessions in mosques or parks in the last year</b>	Yes	103	43.6	Yes=100%
	No	117	49.6	
	Do not know	16	6.8	

(Contd.)

### Fidelity

<b>Motivation of nutritionist to face-to-face nutrition education meeting</b>	Yes	183	92.4	-
	No	15	7.6	
<b>Motivation of nutritionist to group nutrition education sessions</b>	Yes	192	97.0	-
	No	6	3.0	
<b>Motivation of coaches to physical activity sessions</b>	Yes	89	93.7	-
	No	6	6.3	
<b>Simple and understandable nutritional contents</b>	Yes	189	95.4	-
	No	9	4.6	
<b>Quality of received pamphlets</b>	Useful	122	84.1	-
	Non-useful	23	15.9	

### Satisfaction

<b>Clients' long wait time complaints for face-to-face nutrition education</b>	Yes	106	50.2	-
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meetings	No	105	49.8	
Matching forms and intensity of physical activity to client's ability	Yes	129	94.2	-
	No	8	5.8	
High satisfaction of clients with every available EINCP' s services	Group nutrition education sessions	26	21.5	-
	Face-to face nutrition education meetings	37	30.6	
	Physical activity sessions	16	13.2	
	Body weight and blood pressure measuring service	42	34.7	
	Supplementation service	10	4.2	
		101	42.8	
	Overall program			

(Contd.)

Sufficiency of available nutritional services to clients' needs	Yes	185	86.0	
	No	30	14.0	-
Spend adequate time of providers with the clients	Yes	178	86.8	-
	No	27	13.2	
Clients' satisfaction with performance of program providers	High	138	58.5	-
	Medium	72	30.5	

**Table 3. Barriers on implementation of “elderly integrated nutrition care program” (Providers’ perspectives, n=76)**

<b>Implementation problems</b>	<b>Extracted barriers</b>	<b>Frequency</b>	<b>Percent</b>
<b>Low adherence of clients to face-to-face nutrition education meetings</b>	Poor cooperation of early caregivers with nutritionists	60	78.9
	Inappropriate space for face-to-face education	58	76.3
	Lack of a stationed nutritionist in a specific health care center	51	67.1
	Preference of clients to using specialized clinics	68	89.4
	High diversity of health care centers’ clients	68	89.4
<b>Low frequency of telephone calls to the clients</b>	Failure to respond	25	32.9
	Inadequate time of providers	73	96.0
	Presence of only one phone line in the health care center	61	80.3
<b>Low adherence of clients to group nutrition education sessions</b>	Lack of a separate educating room	24	31.6
	Inability of clients to alone attendance	44	57.9
	Low literacy of clients	39	51.3
<b>Low adherence of clients to physical activity sessions</b>	Inefficient information system	59	77.6
	Weather conditions	18	23.7
<b>Low time duration of face-to-face nutrition education meetings</b>	High referrals	59	77.6
	Low time to devote	76	100.0
	Disregarders of Clients to the education	13	17.1
<b>Low time duration of group nutrition education sessions</b>	High demand of clients versus their limited time	25	(Contd.) 32.9
	High diversity of health care centers’ clients	63	82.9
<b>Unregularly education and physical activity sessions</b>	Low-motivated clients	40	52.6
	Inadequate time of providers	69	90.8
<b>Giving pamphlets to the elderly</b>	Pamphlet deficiency	59	77.6

	Clients' illiteracy	16	21.0
<b>Insufficient supplementation</b>	Lack of provider centers' support	76	100.0
	Lack of clients' referrals	61	80.3

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## Figures

**Table 4. The package of instructions for elderly group nutrition education sessions**

<b>Topics</b>	<b>Teaching method</b>	<b>Duration (minutes)</b>
<b>First session</b>		
<b>Brief introduction on educational topics</b>	Identify the topics of each session and give a brief description of them and conduct a pre-test of the course	10
<b>Importance of Nutrition in old age and daily diet needs</b>	Group discussion	25
<b>Evaluation of elderly information</b>	Ask questions and analyze individuals' answers	15
<b>Helping decision making of participants to improve behaviors</b>	Run group discussion and take a final test	20
<b>Second session</b>		
<b>Review of educational topics and contents</b>	Review the last session, introduce the topics of second and third sessions, and take a simple test for start the course	10
<b>Assessment of agreed target behaviors in last session</b>	Ask one of the individuals to suggest a pattern	5
<b>Nutritional needs of elderly (main food groups, diaries group, food replacement table, target behaviors)</b>	Run group discussion, use educational graphs, books, and food pyramid	25
<b>Assessment of obtained information and conclusion on the target behaviors</b>	Ask questions and analyze individuals' answers	10
<b>Helping decision making in the elderly to improve behavior</b>	Run group discussion and take a final test	10
<b>Third session</b>		
<b>Review of the educational topics and contents</b>	Review the last sessions, introduce the topics of this session, and take a simple test for start the course	10
(Contd.)		
<b>Assessment of agreed target behaviors in second session</b>	Ask one of the individuals to suggest a pattern	5
<b>Nutritional needs of elderly (protein group, carbohydrate group, vegetable and fruits)</b>	Run group discussion, use educational graphs, books, and	30

**group), and sugar and fats group, food replacement table, and target behaviors**

food pyramid

**Assessment of obtained information and conclusion on the target behaviors**

Ask questions and analyze individuals' answers

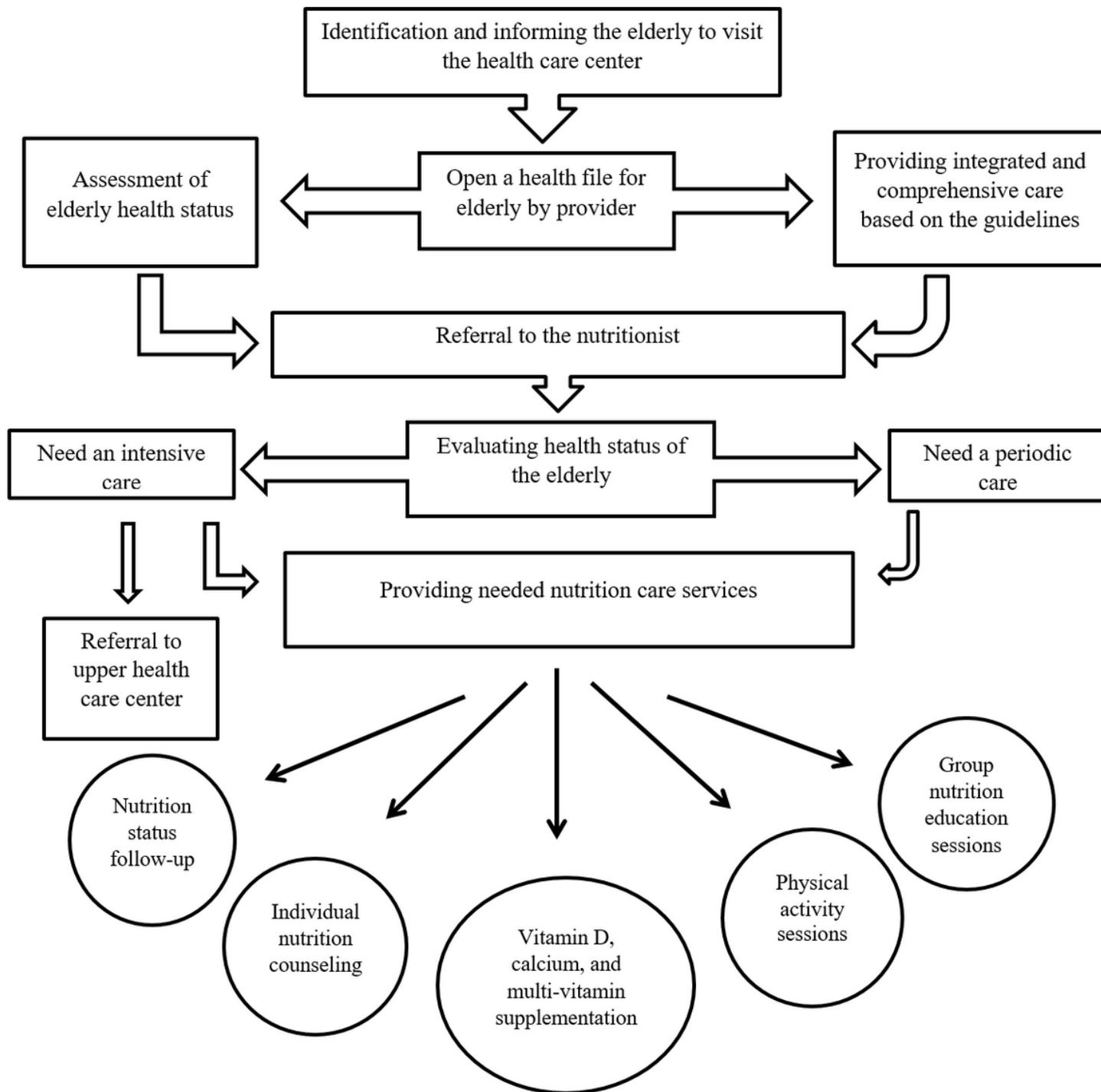
15

**Helping decision making in the elderly to improve behavior**

Group discussion and take a final test

10

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**Figure 1**

Process and components of “elderly integrated nutrition care program” in health care centers of Iran

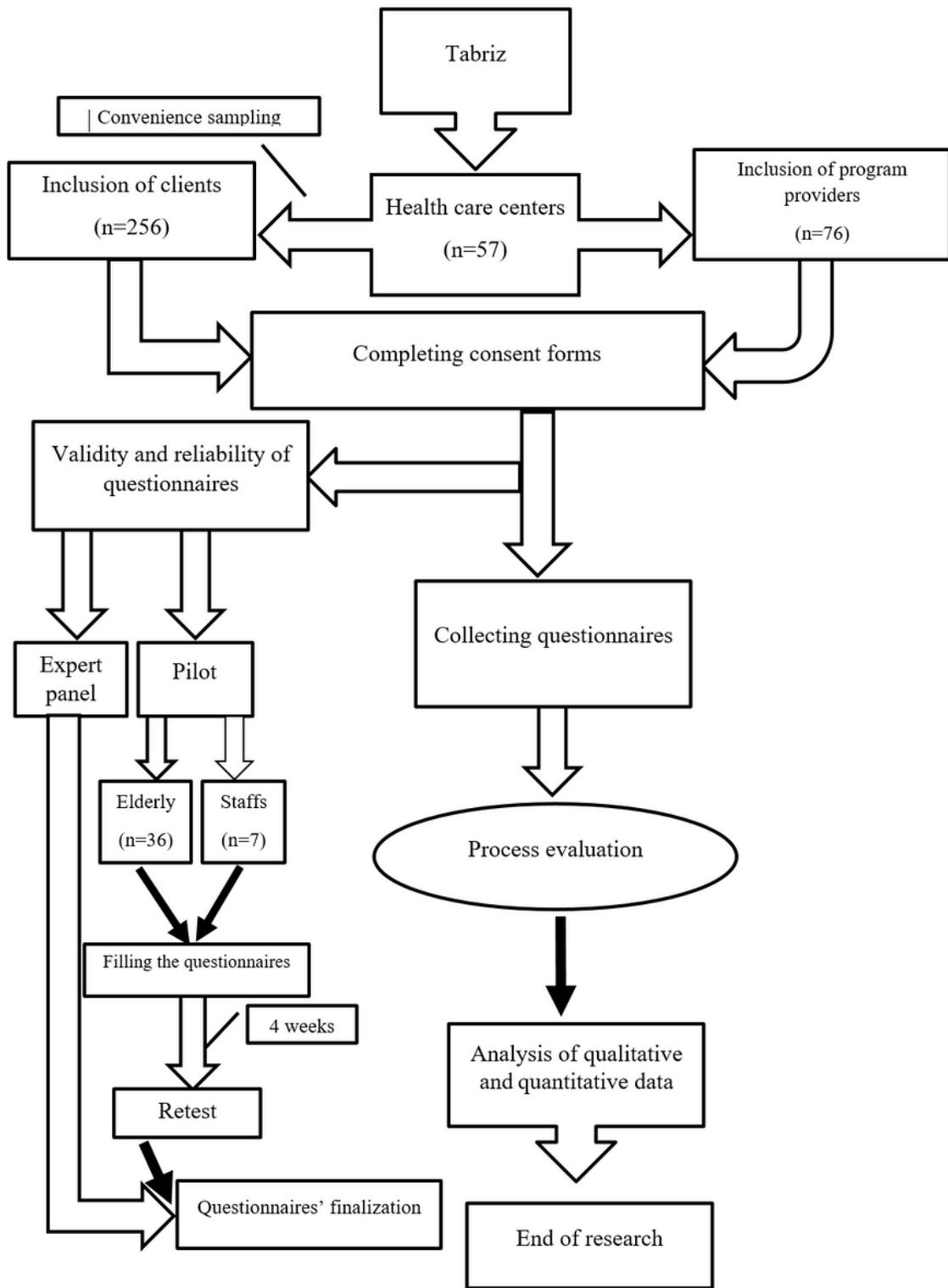


Figure 2

Flowchart of the study

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

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