Study of psychological health of healthy volunteers by symptom checklist 90 (SCL-90) and eysenck personality questionnaire (EPQ).

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Abstract

Psychological health of Chinese healthy volunteers was investigated to provide a theoretical method for phase I clinical trial management and result analysis. Symptom checklist 90 (SCL-90) and Eysenck Personality Questionnaire (EPQ) were used to assess 200 healthy volunteers and to analyse the level of psychological health of Chinese healthy volunteers. SCL-90 result indicates that the average value of positive factors is 10.32 ± 14.26 by self-assessment of healthy volunteers, somatization factor is 1.13 ± 0.13, compulsive symptom factor is 1.29 ± 0.27, interpersonal sensitivity factor is 1.31 ± 0.21, depression factor is 1.26 ± 0.33, anxiety factor is 1.21 ± 0.21, hostility factor is 1.08 ± 0.26, phobia factor is 1.05 ± 0.18, paranoid factor is 1.12 ± 0.23, psychotic symptom factor is 1.17 ± 0.26. Comparing the norm in China, the score of each factor of healthy volunteers is relatively low with statistically significant difference (P<0.001). EPQ result shows that P score is 4.59 ± 2.33, E score is 13.13 ± 4.32, N score is 6.89 ± 5.26, and L score is 13.21 ± 4.25 for 200 healthy volunteers. Comparing the norm in China, the P and N scores are lower, and the E and L scores are higher, with statistically significant difference (P<0.001).

Introduction

Clinical research is a key step for clinical application of a new drug from laboratory. In China, clinical trials and bioequivalence tests are usually referred to as clinical studies [1]. A clinical trial can be divided into four phases in most of countries in the world, and the basic standards and technical requirements of each phase in clinical trial are strictly regulated [2]. The phase I clinical trial, which is also called clinical pharmacology and toxicology phase, aims at the new drugs which have already passed the assessment of pre-clinical safety and efficacy [3]. Normally, only healthy volunteers are involved in phase I clinical trials. In this study, the emotional qualities and personality characteristics of healthy volunteers in phase I clinical trial were investigated to understand the characteristics of volunteer. The current work provides a theoretical fundamental for the management, quality control and results analysis in future clinical studies.

Objectives and Methods

Research objectives

A convenient sampling method was applied to screen the healthy volunteers who have registered in phase I database of qualified units for drug clinical trials in a Beijing upper first-class hospital. 200 volunteers were randomly selected by database administrator according to the registration number, the criteria include: age of 18 or above, able to communicate or write with Chinese language and voluntary participation.

Methods

Two questionnaires were used in this study-symptom checklist 90 (SCL-90) and Eysenck Personality Questionnaire (EPQ).

Symptom checklist 90 (SCL-90)

SCL-90 consists of 90 items, including a very broad area of psychiatric symptomatology ranging from feeling, emotion, thinking, consciousness, behaviors to living habits, interpersonal relationship, diet and sleep. Ten factors are used

to reflect the psychological symptoms in ten aspects, respectively. The results of this questionnaire explain the number of positive items for primary basis (with a score of no less than 2) and score of each factor. The greater is the number of positive items, the higher the score of each factor is, which indicates that the condition of volunteer's psychological health is poor. When a score of an individual is greater than 2 (beyond the normal average number), there might be some psychological problems in that aspect. The questionnaire is a classic self-assessed list. According to Degrogatis report, the validity coefficient of various symptoms is between 0.77 and 0.99. China Scale Collaborative Group has applied Global Assessment Scale (GAS) and Social Introversion scale (SI) to check parallel validity of SCL-90, a negative correlation was found between the total score of SCL-90 and GAS (p<0.05-0.01) and a positive correlation between SCL-90 score and SI (p<0.01). All these results indicate that SCL-90 has good reliability and validity among the normal population. The reliability and validity meet the requirement of measurement [4].

Eysenck personality questionnaire (EPQ)

EPQ was compiled by a British psychologist H.J. Eysenck as a self-report scale, it was developed on the basis of the "Eysenck Personality Inventory" (EH) [5]. The number of items in revised version in China has changed from 107 to 88 [6], including four subscales: internal and external propensity scale (E), neuroticism (N), psychoticism (P) and validity scale (L). The reliability of E, N and L scales is between 0.74 and 0.78. However, the P scale reliability is between 0.54 and 0.60, suggesting that EP makes RSC not only inherit the advantage of original questionnaire with high reliability of E, N and L scale, but also retain the disadvantage of a not stable P scale.

Data collection method

Healthy volunteers were randomly selected by the sequence of number in a phase I clinical trial database of a qualified upper first-class hospital in Beijing, the selected volunteers were firstly contacted by phone to inform them about the purposes and procedures of study. After their agreement, they came to the drug clinical trial institution personally for a check. The staffs who take the responsibility of information collection were professionally trained to ensure that each professional staff adopts standard procedures or manners, such as using the same tone and attitude to communicate with volunteers. Thus the effect of subjective factors of researchers on information acquisition will be minimized and the subjective bias resulting from human factors will be significantly reduced. During the process of questionnaires collection, any missing items were carefully checked to ensure all questions are complete. The survey was conducted by two trained researchers with direct inquiry, one asked questions and the other recorded answers from a volunteer. A total of 200 questionnaires were issued, and 200 valid questionnaires were recovered. The recovery rate and the effective rate in this method were both 100%.

Statistical method

All data were inputted using Epidata 3.0 software, SPSS 18.0 was used for statistical analysis. The continuous variables were expressed by (mean ± standard deviation). The comparison between constituent ratios and rates was conducted using chi square test. P<0.05 was considered as statistical significance.

Results

General information

Average age of the healthy volunteers is 28.6 ± 7.8 y old. Table 1 lists their age, gender, education, work, income, etc.

Table 1. General information of healthy volunteers.

Items	Healthy volunteers (n=200)
Age	
Less than 30	112
Between 30 and 44	88
Between 45 and 59	N/A
More than 60	N/A
Gender	
Male	146
Female	54
Education	
Primary school	3
Junior school	42
High School	82
College	55
University and above	18
Work	
Employed	142
Unemployed	46
Retired	N/A
Housewife	N/A
Student	12
Annual income	
Less than RMB30,000	48
Between RMB30,000 and RMB50,000	110
Between RMB50,000 and RMB70,000	19
Between RMB70,000 and RMB90,000	22

More than 90,000	1		

L score	13.21 ± 4.25	11.75 ± 3.55	0.000

SCL-90 results

The average value of positive factors is 10.32 ± 14.26 by self-assessment of healthy volunteers. Among all factors, somatization factor is 1.13 ± 0.13, compulsive symptom factor is 1.29 ± 0.27, interpersonal sensitivity factor is 1.31 ± 0.21, depression factor is 1.26 ± 0.33, anxiety factor is 1.21 ± 0.21, hostility factor is 1.08 ± 0.26, phobia factor is 1.05 ± 0.18, paranoid factor is 1.12 ± 0.23, psychotic symptom factor is 1.17 ± 0.26.

Comparing the norm in China, the score of each factor of healthy volunteers is relatively low. t test shows that the difference has statistical significance (P<0.001), the data are listed in Table 2.

Table 2. Comparison of results obtained by self-assessment of healthy volunteers and norm data ($\bar{x} \pm SD$).

Item	Healthy volunteers (n=200)	Norm (n=1388)	P
Somatization	1.13 ± 0.13	1.37 ± 0.48	0.000
Compulsive symptom	1.29 ± 0.27	1.62 ± 0.52	0.000
Interpersonal sensitivity	1.31 ± 0.21	1.65 ± 0.61	0.000
Depression	1.26 ± 0.33	1.50 ± 0.59	0.000
Anxiety	1.21 ± 0.21	1.39 ± 0.43	0.000
Hostility	1.08 ± 0.26	1.46 ± 0.55	0.000
Phobia	1.05 ± 0.18	1.23 ± 0.41	0.000
Paranoid	1.12 ± 0.23	1.43 ± 0.57	0.000
Psychotic symptom	1.17 ± 0.26	1.29 ± 0.42	0.000
Average positive factors	10.32 ± 14.26	24.92 ± 18.41	0.000

EPQ scores

According to EPQ results, P score is 4.59 ± 2.33, E score is 13.13 ± 4.32, N score is 6.89 ± 5.26, and L score is 13.21 ± 4.25 for 200 healthy volunteers. Comparing the norm in China, the P and N scores are relatively lower, and the E and L scores are relatively higher. t-test shows that the difference has statistical significance (P<0.001), the data are listed in Table 3.

Table 3. Comparison of EPQ results obtained by healthy volunteers and norm data ($\bar{x} \pm SD$).

Item	Healthy volunteers (n=200)	Norm (n=458)	P
P score	4.59 ± 2.33	7.86 ± 3.05	0.000
E score	13.13 ± 4.32	9.85 ± 4.36	0.000
N score	6.89 ± 5.26	10.81 ± 4.45	0.000

Discussion

The adverse events collection such as SCL-90 is one of the most famous test scale for psychological health all over the world. In this method, ten factors are selected to reflect the psychological symptoms of a person, including somatization, compulsive symptom, interpersonal sensitivity, depression, anxiety, hostility, phobia, paranoid, psychotic symptom, etc. It is commonly used for psychiatric and psychological counselling clinics to understand the psychological status of counsellors, and to examine the mental problems among people having different occupations. Previous studies have shown that the questionnaire has good reliability and validity [7]. SCL-90 has been widely used domestically and internationally in high school students [8], college students [9,10], soldiers [11], tumor patients [12] and other groups of people.

This study has demonstrated that the score of each factor in SCL-90 is lower than norm data of Chinese adults in 1986 [13], suggesting that the overall level of psychological health of Chinese healthy volunteers is significantly lower than general adults. This result is closely related to low-salary income, unstable employment, and large life pressure.

Relevant studies have shown that psychological status of volunteers in Phase I clinical trial mainly includes phobia, anxiety and unstable emotion [13]. Due to the lack of correct understanding towards experimental drugs and programs, Phase I volunteers might exhibit suspicion and phobia to drugs and adverse events, respectively, as well as a resistance to blood sampling [14]. These observations are consistent with the results in this study. Jiang et al. [15] applied the self-rating anxiety scale and self-rating depression scale to assess psychological status of 35 healthy volunteers before and after clinical trials. They have found that healthy volunteers have anxiety before and after clinical trials. The current study shows that there are no symptoms of anxiety, phobia, somatization and paranoid found in healthy volunteers, which might be related to two aspects. First, these volunteers have participated in Phase I clinical trials before. Second, they are not currently present in a clinical trial.

During a phase I clinical trial, the drugs are used in human body for the first time. Therefore it is inevitably for the healthy volunteers to product fluctuation in their psychological conditions. This fluctuation will affect final result on the one hand [16], and result in an unsatisfied emotion on the other hand [17]. In this study, the items such as somatization, compulsive symptom, anxiety, paranoid and psychotic symptom in SCL-90 can reflect a subjective sense for physical discomfort, and trigger physical characterizations which are related to adverse events. Other factors such as interpersonal sensitivity, depression, hostility and phobia mainly reflected to the aspect of individual thinking, which related to the compliance during the process of clinical trial. Therefore, understanding the emotional characteristics of volunteers

before phase I clinical trials is critical to the management of volunteers and adverse events during phase I clinical trial, which further affect the quality and outcome of overall clinical trial.

The EPQ describes the personality of volunteers from three mutually orthogonal dimensions, including introversion and extroversion (E), neuroticism (N), and psychoticism (P). Researchers can understand different personal characteristics from these three aspects. In this study, the adult questionnaire containing 88 questions made by Gong [6] was applied to investigate personality characteristics of healthy volunteers. The results from this study will be helpful to the research of the effects of psychological emotion on clinical results of volunteers in phase I clinical trials.

This study has demonstrated that the score of E factor of healthy volunteers is higher than the norm data, suggesting that the volunteers in this experimental group are more extroverted with a tendency of more outgoing personality, better social skills, more eager to experience excitement and adventure. They belong to the type of incontrollable emotion with higher social immature level. While the scores of P and N dimensional factors are lower than the norm data, suggesting that the volunteer in this group are more stable, sympathetic and concerned about others. This result is consistent with Ouyang et al.'s conclusion on 119 healthy volunteers [18], but slightly different from Jiang et al.'s paper about 35 healthy volunteers in phase I clinical trial [15]. This might due to the difference in the representative of samples. In the study of Jiang et al., the age of healthy volunteers is mainly between 18 and 22 y old with greater emotional fluctuation. The score of L factor in this study indicates that current study has better stability.

Relevant studies [19] have demonstrated that the personal characteristics of the volunteers may influence pharmacokinetics or pharmacodynamics of a drug. According to Meyer et al.'s result [20], a single dose of 0.3 mg/kg diazepam which was used to an extrovert individual could significantly damage the reaction capacity, while the reaction ability of an introvert was not affected by the same amount of dose. Nakano et al.'s study showed that the oral intake of caffeine and diazepam is significantly faster to the individuals with higher score of N dimensional factor [21]. The current study suggests that assessment of personality characteristics of healthy volunteers is significant to the outcome of clinical trials.

This study has shown that the personality characteristics and emotional qualities of healthy volunteers are both different with Chinese norm data, and both factors will significantly affect the management and results of during the process of clinical trials. Current study suggests that valid assessment methods should be used to predict the emotional qualities and personality characteristics of the volunteers in the future before they are involved the experimental groups of clinical trials, which can provide theoretical fundamentals for the management of volunteers and test results. During the clinical trails the different emotions and personality characteristics of volunteers can be effectively administrated to improve compliance of volunteers and to minimize the occurrence of false or adverse events. The quality and efficiency of clinical trials will be further improved consequently.

This study selected a single clinical unit to conduct the research, therefore the result will contain a bias and deviation. In the future, this type of clinical trial can be carried out in multi clinical centers to minimize the selective bias and to allow the results more representative and instructive. It should be noted that the survey method used in this study are not suitable for quantitative analysis and multi-factor analysis to relevant factors. A specific method for measurement should be formulated and evaluated to access the cognition and willingness to participate in clinical trials, which will significantly facilitate the comparison between different studies.

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