

Changes in Chinese Patients' Trust in Doctor: a Systematic Review and Meta-Analysis

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Research

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Abstract

Background: To understand how patient's trust has changed over time in China and explore the influencing factors of the changes.

Methods: Databases were systematically searched from inception to Jan 1, 2020 for studies of patient's trust in China investigating the change of the patient's trust over time and the factors which influence the trust.

Results: The cross-temporal meta-analysis results showed that the total trust, benevolence trust and technical competence trust of Chinese patients decreased rapidly across the year of data collection. The related meta-analysis results showed that trust and patient demographic variables have a weak but significant correlation (gender: $r = 0.032$; 95% CI 0.012, 0.052; $p = 0.002$; age: $r = 0.079$; 95% CI 0.047, 0.111; $p < 0.001$; education: $r = 0.092$; 95% CI 0.054, 0.131; $p < 0.001$). The medical policy stage and patient type had a significant influence on changes of trust.

Conclusion: Patients' trust in doctors have declined with increasing years, and farmer-friendly policy, conflicts and individuals' characteristics influence patients' trust.

Practice implication: Chinese government should attach importance to the public welfare-oriented policies. Medical institutions need pay more attention to the diverse trust levels of different patient groups and strengthen the training of doctors' benevolence skills.

Introduction

Trust, the core of the harmonious doctor-patient relationship, is related to the process and the final results of medical diagnosis and treatment.¹ A majority of the existing empirical and theoretical research in this area has shown that the patient who trusts the doctor has more satisfaction at the treatment, more beneficial health behaviors and higher intention to comply.²⁻⁴ In contrast, due to mistrust, the patient suspects the doctor's motivation and even treats the therapeutic staff aggressively.⁵ During the process, necessary self-protection measures by the doctor lead to conservative medical treatment and difficulty of communication.⁶ Therefore, a good patient's trust is not only the basis of effective treatment but also a vital link to build a harmonious doctor-patient relationship.

Patient's trust

Patient's trust is the willingness of the patient to be vulnerable to the actions of the doctor based on the expectation that the doctor will perform a particular action important to the patient, irrespective of the ability to monitor or control that the doctor.^{7,8} Due to the painful injury of the disease and the asymmetry of information in the medical process, the patient trust their doctor who can bring them recovery.⁹⁻¹²

With regard to the types of the patient's trust, Hall classified it into two categories: technical competence trust, which is qualified practice skills to make correct decisions and avoid mistakes, and benevolence trust, which is interpersonal and communication skills to care the patient's interests and tell the truth.⁸ Besides, some researchers have proposed that patient's trust consists of affective trust and cognitive trust.^{13,14} Sun and Wang conceptualized patient's trust as three-dimensional: interpersonal trust, intergroup trust and institutional trust.¹⁵⁻¹⁷ We adopted the Hall's classification in this study which was used by the most researchers.^{2,8}

There are a variety of the patient's trust scales, especially in the developed countries. In 1990, Anderson explored the first English-language scale for the systematic assessment of patient trust which has good reliability and established a standard for such measurement tools in the future.¹⁸ Since then, many researchers have begun systematic studies on patient's trust scales, such as the Safran Primary Care Scale,¹⁹ the Kao Patient Trust Scale,²⁰ and the Wake Forest Physician Trust Scale (WFPTS).⁸ However, the study of the patients' trust scale in China is still in the initial stage, because most researchers used the Chinese adaptation of the WFPTS to assess the patients' trust in China, rather than designing questionnaires based on the actual state of China.^{2, 21-23}

Patient's trust in China

At present, the status of the patient's trust in the world is still unknown. The global comparisons of trust attitudes around the world suggested that the share of people reporting to trust others in China is much higher than that in most developed countries.²⁴ However, in the past decade, doctor-patient conflicts occurred frequently and the negative reports about the relationship between doctors and patients have been overwhelming in China, which led to the original harmonious doctor-patient relationship has been becoming tense.¹²

Before 2009, the patient's trust in China was high.²⁵ However, the results of several studies in recent years have shown that the patient's trust was at a low level.²⁶⁻³⁰ Meanwhile, after comparing the level of interpersonal patient's trust between China in 2011 and 2016, it was found that the trust in 2016 was significantly lower than that in 2011.²³ These findings have prompted calls for increased attention to the patient's trust in China.

In 2002, Chinese researchers started exploring doctor-patient trust from the perspective of ethics. There is quite more theoretical research on the concept, model construction, evolution process and evaluation system, while few empirical studies focus on improving patient's trust.³¹ As far as the research content is concerned, the current empirical research of patient's trust has been lagging behind the investigation of the characteristics and overall situation of both doctors and patients, which lacks in-depth medical research with the dynamic and systematic construction. With regard to the measurement tools, we lack a universal scale that is fully applicable to the Chinese patient's trust research. These studies in China, which should have supported the government in improving patient's trust, are still in their infancy.

Therefore, it is urgent for Chinese organizations and researchers to take better measures to improve the patient's trust.

Factors influencing patient's trust in China

In order to improve the patient's trust, we need to explore the main influencing factors of the trust in China. Some researchers summarize the antecedents of the patient's trust, including social environment, treatment situations and individual characteristics.¹² At present, few research studies in China focus on treatment situations and doctors' characteristics. Therefore, we summarized the influencing factors of the patient's trust from two aspects: patients' characteristics and social environment.

Patients' characteristics

A majority of the existing empirical researches in this area have begun to focus on the influence of patients' characteristics.^{12,22,32} From the perspective of patient demographic variables which were studied most, some research pointed out that female patients and the patient with the same gender as the doctor trust doctors more;^{33,34} some studies found that patient age is negatively related to patient's trust,³³ but some evidence show the opposite result.^{1,22,34} Additionally, a positive correlation between patients with different educational background and the patient's trust was also demonstrated.³⁵ However, the relationship among patient gender, age, education and trust are controversial, since some studies found no clear correlation between them,³⁶⁻³⁸ and some research investigated that patient gender, age, education may influence the patient's trust.³²⁻³⁴ Additionally, little evidence showed that these factors such as occupation, social class, economic status, and family background seem to affect patient's trust.^{12,39-41} Inpatients, rural patients and the patient with the serious illness also have a high level of trust.^{25,42,43}

Social environment

The formation of patient's trust depends not only on patients' characteristics, but also on social factors such as government, organizations and media. Among them, the changes of China's medical policy and the growing number of doctor-patient conflicts have the greatest impact on the patient's trust.⁴⁴⁻⁴⁶

In 1949-1977, the doctor-patient relationship was good. People enjoyed free medical services and high public welfare. However, a market-oriented operation adopted in the healthcare industry led to the fragile doctor-patient relationship in 1978-2002. Since 2003, in order to better realize the transition from market-oriented operations to public welfare-oriented operations for the medical industry, the State Council of China launched a new round of medical reform programs in 2009, which aimed to establish and develop the basic coverage system for urban and rural residents. Especially, with the incessant deepening of the healthcare industry reform between 2013 and 2017, a package of measures has been established, including the hierarchical medical system, lowering drug prices, medical insurance fee system, promoting the reform of public hospitals, and equalization of basic public health service.⁴⁴ The farmer-friendly

policy which involved in the interests of a majority of the people may promote the trust level of the public.^{24,45}

However, in recent years, China's doctor-patient conflicts occurred frequently. Statistics from the National Health and Family Planning Commission of China (2001-2016) showed that the number of vicious incidents caused by doctor-patient conflicts was 4,914 in 2001, increasing to over 8,000 in 2004, and nearly 10,000 in 2006. In 2016, the number of conflicts between doctors and patients was 20,833.⁴⁶⁻⁴⁹ Violence against the medical personnel has become a terrible wound in Chinese society.⁵⁰ These conflicts exacerbated the mistrust between doctors and patients,⁵¹ which is also the main reason for the deterioration of the doctor-patient relationship.⁵²

Although we summarized these important factors on patient's trust, evidence about the role of these influencing factors in the patient's trust is still unknown. Therefore, it is essential for China to understand the changing trend of patient's trust in these years, explore the effect of the influencing factors of the changes and determine the relationship between some patient characteristics and patient's trust. To date, to our knowledge, there is no studies comprehensively examining the status of patient's trust, including the status, influencing factors, existing problems and future research directions of Chinese patient's trust. To address this research gap, we conducted a systematic review and a cross-temporal meta-analysis to explore whether patients' trust to doctors has changed over the years.⁵³⁻⁵⁵ We also investigated whether the policy stage, the type of patients, and the scales differentially influence the trust. Especially, about the patient type, most studies used *t* test and *F* test to analyze the relationship between some patient characteristics (gender, age and education) and patient's trust, rather than separately exploring the trust value of different gender, age and education. In order to clarify the influence of these patient characteristics on patient's trust, we conducted a related meta-analysis to examine the association between patient demographic variables (gender, age, and education) and patient's trust.

Methods

Search strategy and selection criteria

In accordance with the PRISMA guidelines⁵⁶, we began our systematic literature search for studies by some widely used academic databases from database inception to Jan 1, 2020, including Wanfang, CNKI, Google Scholar, PubMed, Web of Science, the Social Sciences Citation Index, Chinese Doctoral Dissertations Full-Text Database, and Chinese Master's Dissertations Full-Text Database. Studies were located by employing combinations of the following search terms with no language restrictions: China, Chinese, trust, physician, doctor, and patient.

We included studies using quantitative data to assess the trust of Chinese patients or the association between patients' trust and patients' demographic variables. We included studies in which sufficient data were reported (Mean, Standard Deviation and Sample size; *r* value or *F*, *t* or χ^2 value that can be converted to *r* wherever possible).⁵⁷ We excluded studies of case vignettes, interviews, reviews and theory. We

required studies to measure interpersonal and intergroup trust to doctors with a valid, reliable and established trust questionnaire. Papers from which data were extracted are marked with an asterisk in the reference section.

Two reviewers (Y.L. and P.W.) independently screened each abstract and full-text article, and excluded those that were not ineligible. Discrepancies about inclusion of full-text reports were resolved by discussion. The study protocol is available online.

Data analysis

We designed two data extraction tables to extract data on the average patient's trust score (including total trust, benevolence trust and technical competence trust), sample size, publication year and data collection year for the cross-temporal meta-analysis (table 1), and the r value (the association between trust and gender, age, education), sample size, publication year and data collection year for the related meta-analysis (table 2) (appendix). Additionally, the year of data collection, which indicated participants' birth cohort, was coded one year prior to submitting the dissertation and two years prior to publication unless another date was reported in the article.⁵⁸⁻⁶⁰ If data from two studies were reported in one publication, we extracted data from each study independently. Data extraction was conducted by two reviewers (Y.L. and P.W.).

Meanwhile, the results of the cross-temporal meta-analysis will be affected by the characteristics of participants.^{54,61} So, patient type was also recorded in the first code. In order to further determine the effect of medical policy stages on patient's trust, combined with the classification of medical policy stages,⁴⁴ we further divided the data collection years into two stages in view of different process of new medical reform, one is the early stage of reform (2008-2012), the other is the later stage which developed comparatively mature (2013-2017). Besides, less literature used the same scale (only half of the studies use the Wake Forest Patient Trust Scale), in order to prevent publication bias due to the missing data, we tried to include researches that using valid self-created and adapted questionnaires with similar research content while ensuring the quality of literature, and conducted subgroup analysis on these scales in the results. Thus, we also recorded medical policy stages and patient's trust measurement dimensions in two sheets.

Risk of bias was assessed by two reviewers (Y.L. and P.W.) using the Newcastle-Ottawa Quality Assessment scale for observational study designs.⁶² The quality tiers used for categorization of studies as 'Low', 'Intermediate' and 'High' quality were presented in the appendix.

In the cross-temporal meta-analysis, we conducted the weighted regression analysis to explore the change in the patient's trust (including total trust, benevolence trust and technical competence trust) over time. Then, we did moderator analysis on medical policy stages, patient type, and patient's trust measurement dimensions; In the related meta-analysis, we measured heterogeneity using I^2 statistic and assessed publication bias by funnel plots and Egger test in separate models. Then, we carried out the

meta-analysis to assess correlations between patient's trust and patient demographic variables (gender, age, and education), and performed subgroup analysis on medical policy stages and patient's trust measurement. All statistical analyses were done using Excel 2018, SPSS 24.0 and Stata 14.0.⁶³

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and Y.L. and P.W. had final responsibility for the decision to submit for publication.

Results

Search results and quality assessment

Our search strategy identified 544 articles, of which 40 met eligibility criteria for full-text review (figure 1). Among the 40 studies that were published between 2009 and 2019 with 48,376 participants, 33 studies with 45,711 participants were used to conduct the cross-temporal meta-analysis,^{2,21-23,25-29,32,34,35,37,38,41-43,64-79} and 17 studies with 9,976 participants were used to conduct the related meta-analysis.^{2,21,26,32,34-38,65,71,80-85} Of the 40 qualitative studies, 28 were deemed to be of 'high' quality and 12 were deemed to be of 'Intermediate' quality according to our evaluation by using the Newcastle-Ottawa Quality Assessment scale. No studies were excluded on the basis of quality.

Cross-temporal meta-analysis

The trends in different types of patient's trust

According to the shape of the Scatter chart (figure 2, 3), a generally linear decline in patient's trust from 2008 to 2017 and two large fluctuations separately at 2009 in figure 2 and 2013 in figure 3 were shown. In order to clarify the differences in trust between years, we conducted variance analysis in total trust, benevolence trust and technical competence trust. The result showed that patient's trust in 2009 ($M = 4.154$, $SD = 0.127$) was significantly higher than that in 2008 ($M = 3.316$, $SD = 0.470$) ($t = -3.504$, $p = 0.017$) in total trust, and patient's trust in 2013 ($M = 3.049$, $SD = 0.035$) was significantly lower than that in 2011 ($M = 4.142$, $SD = 0.371$) ($t = 3.941$, $p = 0.029$) in benevolence trust.

Correlations between trust and years

Since these patients' trust levels were all showing a downward trend after 2009, it was more meaningful to analyze the correlations from 2009 to 2017. When sample size was weighted, the total trust scores has a significant correlation with year of data collection, $\beta = -0.445$, $p = 0.001$, the benevolence trust scores also has a significant correlation with year of data collection, $\beta = -0.044$, $p = 0.034$, and the correlation between technical competence trust and year of data collection was -0.390 , $p = 0.066$. These suggested that patients' trust scores decreased over time.

To calculate the magnitude of change in all trust scores, we predicted the mean scores of the first (2009) and last year (2017) of the included studies by conducting the weighted regression analysis with patient's trust scores and year of data collection as the dependent and independent variables and averaged all the standard deviations reported in the studies through calculating the average standard deviation.^{86,87} The regression equation is: $y = Bx + C$, y is the average score of various types of trust, B is the partial regression coefficient, x is the year of data collection, and C is a constant. The regression equations for total trust, benevolence trust, and technical competence trust were: $y = -0.078x + 159.846$ ($p = 0.010$), $y = -0.080x + 164.344$ ($p = 0.027$), and $y = -0.065x + 134.899$ ($p = 0.054$). The mean of total trust decreased by 0.624, from 3.144 in 2009 to 2.520 in 2017 and scores decreased by 0.845 standard deviations from 2009 to 2017, which is $d = 0.845$; The mean of benevolence trust decreased by 0.640 from 3.624 in 2009 to 2.984 in 2017 and scores decreased by 0.982 standard deviations, that is $d = 0.982$. The mean of technical competence trust decreased by 0.520 from 4.314 in 2009 to 3.794 in 2017 and scores decreased by 0.590 standard deviations, that is $d = 0.590$. According to Cohen's interpretation of effect size,⁸⁸ $d = 0.80$ is large, and $d = 0.50$ is classified as moderate. Therefore, $d = 0.845$ and $d = 0.982$ should be regarded as a large effect size, $d = 0.590$ should be considered a moderate effect size. The above results showed that the levels of the total trust and benevolence trust in Chinese patients declined rapidly across the years of data collection.

Moderator analysis

The results indicated that the medical policy stage had a significant influence on trust, and patient's trust questionnaires had no significant effect on the relationship between trust and year (table 3). All trust values of the previous stage were significantly higher than the later stage. What's more, in the patient type, it was found that inpatients had higher results in total trust than outpatients significantly and rural patients had higher trust levels than urban patients by using independent t -test.

Table 1. Moderator analyses

Trust	Moderator	<i>M</i> ± <i>SD</i>	<i>t</i> / <i>F</i>	<i>p</i>
	Medical policy stages			
Total	Stage I	3.852±0.086	16.708	<0.001
	Stage II	3.457±0.044		
benevolence	Stage I	4.093±0.226	7.021	0.015
	Stage II	3.475±0.056		
technical competence	Stage I	4.192±0.218	9.622	0.005
	Stage II	3.495±0.053		
	Patient Types			
Total	Inpatient	3.691±0.083	9.089	0.007
	Outpatient	3.297±0.101		
benevolence	Inpatient	3.722±0.098	2.278	0.152
	Outpatient	3.406±0.185		
technical competence	Inpatient	3.755±0.080	0.207	0.656
	Outpatient	3.677±0.152		
total	Urban patient	3.726±0.112	0.304	0.605
	Rural patient	3.815±0.116		
	Scale Types			
Total	Wake Forest Patient Trust Scale	3.456±0.065	3.030	0.088
	Other Trust Questionnaires	3.610±0.060		
benevolence	Wake Forest Patient Trust Scale	3.501±0.067	0.146	0.706
	Other Trust Questionnaires	3.568±0.163		
technical competence	Wake Forest Patient Trust Scale	3.492±0.063	3.189	0.088
	Other Trust Questionnaires	3.788±0.153		

Related meta-analysis

Heterogeneity

The random effect model and the fixed effect model are two main models in meta-analysis.⁸⁹ Higgins believed that I^2 is 25%, 50%, and 75%, which means low heterogeneity, medium heterogeneity, and high heterogeneity, respectively.⁹⁰ Hedges proposed that the random effect model is more appropriate when

the Heterogeneity test result is significant, otherwise, the fixed effect model is selected.⁸⁹ Combined with the above two criteria, the heterogeneity tests were conducted on the meta-analysis data of the relationship between patients' gender, age, education and patient's trust. The results showed that the effect size of the gender data was homogeneous but the effect size of the age and education data were heterogeneous. Therefore, it is appropriate for the gender data to choose the fixed-effect model on the grounds that 31.5% of the observed variation in the gender data was caused by the real difference between the two, and yet the random effect model was suitable for the age and gender data due to 50.3% and 58.8% observed variation (table 2).⁹¹

Publication bias

Publication bias tests were performed by using a funnel plot and Egger test.⁹² From the funnel plot, the studies involved in this study were distributed evenly on both sides of the total effect. According to the Egger test,⁹³ there was no publication bias for gender ($t = 1.73, p = 0.104$) and education ($t = 2.07, p = 0.061$). Although there was publication bias for age ($t = 2.50, p = 0.025$), the number of missing studies was estimated to be 5 after 5 iterations with the Linear method, and 5 similar studies were added around the center of the funnel plot at the opposite mirror position by the trim-and-fill analysis.⁹⁴ Then, the meta-analysis was performed again using the random effects model. The new combined effect index was 0.055 ([95% CI 0.024-0.085]; $p < 0.001$). Because the combined effect index before trimming was 0.079 ([95% CI 0.047-0.111]; $p < 0.001$), and there was not much difference between the two combined results. Therefore, it could be considered that although there was a slight publication bias in the age data, the results were still valid (appendix).⁹⁵

Association between trust and patient demographic variables

Across all outcomes, we found a small but significant correlation between trust and patient demographic variables (gender: $r = 0.032$ [95% CI 0.012-0.052]; $p = 0.002$; age: $r = 0.079$ [95% CI 0.047-0.111]; $p < 0.001$; education: $r = 0.092$ [95% CI 0.054-0.131]; $p < 0.001$) (table 2 and figure 4-6 which shows all forest plots).

Table 2. Associations between patient's trust and patient demographic variables

patient demographic variables	N of studies (patients)	Q (df)	ρ	r	95% CI	Z
Gender	17 (9771)	23.35 (16)	31.5%	0.032	0.012, 0.052	3.17**
Age	16 (9592)	30.15 (15) *	50.3%	0.079	0.047, 0.111	4.89***
Education	14 (7948)	31.52 (13) **	58.8%	0.092	0.054, 0.131	4.70***

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; r = correlation, CI = confidence interval.

Subgroup analysis

Stratified analysis showed some variation in associations between gender, age and trust when studies were analyzed at different medical policy stages. In the medical policy stage 1, the results of association between gender, age and trust were insignificant. However, in the stage 2, the results of these association were significant, which indicated that women and the seniors report more trust to their doctors. No variation in associations between patient demographic variables and trust when different trust questionnaires were used (table 3).

Table 3. Associations between patient's trust and patient demographic variables stratified according to the Medical policy stages and Trust Questionnaire.

Patient Variable	Subgroup	N of studies (patients)	<i>r</i>	95% <i>CI</i>	<i>Z</i>	<i>p</i>
Gender	Medical policy stages					
	Stage I	5 (1406)	0.033	-0.019, 0.085	1.25	0.213
	Stage II	12 (8365)	0.032	0.010, 0.053	2.92	0.004
	Trust Questionnaire					
	Wake Forest Patient Trust Scale	9 (6222)	0.027	0.002, 0.051	2.11	0.035
	Other Trust Questionnaires	8 (3549)	0.041	0.009, 0.074	2.47	0.013
Age	Medical policy stages					
	Stage I	5 (1611)	0.076	-0.006, 0.159	1.82	0.069
	Stage II	11 (7981)	0.079	0.047, 0.112	4.51	<0.001
	Trust Questionnaire					
	Wake Forest Patient Trust Scale	7 (5560)	0.079	0.033, 0.142	3.73	0.002
	Other Trust Questionnaires	9 (4032)	0.075	0.036, 0.115	3.73	<0.001
Education	Medical policy stages					
	Stage I	4 (1204)	0.146	0.027, 0.264	2.41	0.016
	Stage II	10 (6744)	0.069	0.035, 0.085	4.72	<0.001
	Trust Questionnaire					
	Wake Forest Patient Trust Scale	8 (5838)	0.111	0.050, 0.172	3.56	<0.001
	Other Trust Questionnaires	6 (2110)	0.072	0.030, 0.115	3.34	0.001

Note. *r* = correlation; *CI* = confidence interval.

Discussion

The patient's trust decline in China

Our research conducted the cross-temporal meta-analysis on patients' trust over the past ten years and found patients' total trust, benevolence trust and technical competence trust to doctors have declined within these years. This result was in agreement with the findings of a comparison of interpersonal trust levels in 2011 and 2016.²³

The main reasons for the decline in patient's trust in the past decade are as follows. Doctor-patient disputes could exacerbate doctor-patient mistrust.⁵¹ According to the National Health and Family Planning Statistical Yearbook 2017, the number of medical disputes handled by the courts in 2016 was twice that in 2006; the relevant statistics from the national health department (2016) also showed that the number of incidents where medical services were disrupted by patients increased by five times compared with 2001.⁴⁶⁻⁴⁸ Meanwhile, the doctor's negative image was fabricated from 2011 to 2015 due to the media's unreasonable reporting framework on medical disputes, which has had a greater impact on patient's trust.^{96,97} What's worse, the news 'labeling', onblur and irrational public opinions further pushed the doctor-patient relationship into the abyss.⁹⁸⁻¹⁰⁰

More importantly, different stages of medical policy had a great impact on trust. China's medical system entered the stage of marketization after 1978: the government categorized hospitals as private ownership, excessive market competition led to the gradual decrease of government health investment, the healthcare service gap between urban and rural expanded, and patient medical costs rapidly increased.⁴⁴ Among them, marketization had a restraining effect on trust.¹⁰¹ Therefore, in 2009, a new round of medical reform was launched to reverse marketization by increasing public welfare and improving the medical insurance system. From the overall trust value in 2009 (Figure 2), it can be seen that this measure has had some effects on trust. However, the development of market rules was still insufficient to fully protect the interests of patients.¹⁰² In particular, from the changes of benevolence trust and technical competence trust, it can be seen that the trust of patients in China has declined significantly before 2013. After 2013, a series of measures were vigorously carried out to strengthen the construction of public service system, such as improving the primary care system, increasing grassroots medical institutions, optimizing the allocation of medical resources, strengthening medical supplies regulation, improving the pharmaceutical distribution system, and building a universal health care system.⁴⁴ According to the data of the National Health and Family Planning Commission of the PRC, the new rural cooperative medical insurance accounted for nearly 95%, and the government and medical insurance beard 299.5 billion yuan (71.1%) of China's total health expenditure in 2016, which to some extent reduced the burden of patients, so patient's trust has been stable. It is worth noting that though the Chinese government has invested heavily in the medical industry, new healthcare reform is still faced with numerous difficulties and challenges: the dislocation profit model, the rising of drugs, and the burdensome medical insurance fund. Thus, the trust value of the later stage (2013-2017) was still low. White Paper: Medical and Health Services in China pointed out that the contradiction among China's current series of policy, public health needs and the coordinated development of the economy and society was still unsuitable and prominent. During the outbreak of novel coronavirus (2019-nCoV), a lot of emotional construction aimed to improve the doctor-patient relationship was carried out throughout the

country. However, serious violent incidence between doctors and patients still occurred, since the medical policy could not meet the needs of patients.

Additionally, our results also showed that the benevolence trust decreased rapidly across the years. The possible reasons are as follows: The rigid behavior and the dehumanizing medical attitude of the doctor may affect the patient's perception of benevolence and trust;^{103,104} In addition, excessive medical treatment has been widespread in China in recent years: Doctors put patients on drugs excessively in order to avoid medical treatment risk or to get more pharmaceutical rebates.⁴⁴ It is difficult for the patient to clarify the motivation of the doctor for excessive medical treatment, which leads to suspicion of doctor's professional ethics;^{105,106} Furthermore, high medical costs and fee-for-service systems also affect benevolent trust. Since Chinese patients must pay separately at each step of the medical treatment process (consultation, diagnosis, intravenous drip, medication, etc.), that is, money seems to be emphasized throughout all medical processes, this payment term is likely to increase patients' distrust in doctors' benevolence.¹⁰⁷

Patient's characteristics influence trust

The results of the related meta-analysis showed that patients' gender, age, and education were significantly related to patients' trust, though these correlations were low ($r_{\text{gender}} = 0.032$, $r_{\text{age}} = 0.079$, $r_{\text{education}} = 0.092$).⁸⁸ Of particular relevance to the trust domain, women are characterized by a desire to form and maintain relationships compared to men.^{108,109} So, women are more likely to trust their doctor. With regard to age, the older contact doctors more frequently and are more dependent on doctors. Thus, the senior reported to have more trust to the doctor. Lastly, the evidence suggests that education is one of the strongest factors associated with social capital in general and greater trust in particular: the better educated individuals are, the higher social status they have, the more likely they are to have high levels of trust.¹¹⁰⁻¹¹² In addition, the medical policy stage, as a moderator variable, had positive effects on the association results of gender and age, which indicated that the construction of the public service system was positively promoting the relationship between gender, age and trust to a certain extent. Studies have demonstrated that the female and the senior have made greater use of basic public health services in recent years.¹¹³ It can be seen that the construction of the public service system has brought benefits to relatively vulnerable groups and promoted their perception of trust.

According to the results of the moderator analysis in the cross-temporal meta-analysis, the study also found that inpatients had significantly higher trust levels (total trust, benevolence trust and technical competence trust) than outpatients. This result was in line with the findings of Tam and Jiang.^{25,43} Based on Service Encounter Theory,¹¹⁴ the generation of trust has a cognitive basis, and the increased interaction between the doctor and the patient is conducive to the patient's trust.¹⁰² Compared with outpatients, inpatients have longer contact time with doctors, so they are more familiar with their doctors, and doctors also have a more detailed understanding of inpatients.^{68,102,115} What's more, according to Interdependency Theory,¹¹⁶ two-way dependence situations and high levels of patient dependence

promote patients' trust.¹¹⁷ In general, the conditions of inpatients are more serious than those of outpatients, thus inpatients rely on doctors more and give them more hope for health.²⁵ So, the inpatient has a higher level of trust. For the same reason, rural patients' trust in doctors was more than urban patients' trust. Some studies have investigated the differences in the doctor-patient relationship between urban and rural areas, and found that rural patients usually seek medical treatment in rural health clinics or village clinics.⁴² Villagers are familiar with their doctors, and convenient to seek medical treatment. However, municipal hospitals have fewer communication opportunities and higher costs. As a result, rural patients have higher levels of trust in doctors.

Implications and limitations

The comprehensive scope of this review on the patient's trust in China is a strength, since we combined the cross-temporal meta-analysis and the related meta-analysis to analyze the status of the patient's trust and the effect of the influencing factors, with low publication bias. However, this study has limitations. Our original systematic search did not include literature published in 2010, since there was no data for that year, and thus it might affect the results. Also, the number of researches included in this review was not large. However, the quality and data of the included studies were sufficient to explore the changing trends of patient's trust.

In Summary, in the past ten years (2008-2017), the trust of Chinese patients has shown a downward trend, and the benevolence trust has fallen fastest. Medical policy, doctor-patient disputes and patients characteristics influence the trust. Therefore, our government should attach importance to the public welfare-oriented policies and formulate relevant policies to resolve doctor-patient conflicts, medical institutions need to pay more attention to the diverse trust levels of different patient groups and strengthen the training of doctors' benevolence skills, and researches ought to improve measurement tools which is applicable to the Chinese patient's trust research and conduct more in-depth medical researches to improve the patient's trust.

Declarations

Ethical Approval and Consent to participate

This study was approved by the local ethics committee of Shanghai Normal University and was conducted in accordance with the Declaration of Helsinki (2013). All participants were informed before the investigation began.

- Conflict of Interest

The authors declare that they have no conflict of interest.

- Consent for publication

The authors both agree to public.

- **Availability of supporting data**We provide our data to readers and researchers whenever they need it.-

Competing interests

The authors have no competing interests to declare.

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Figures

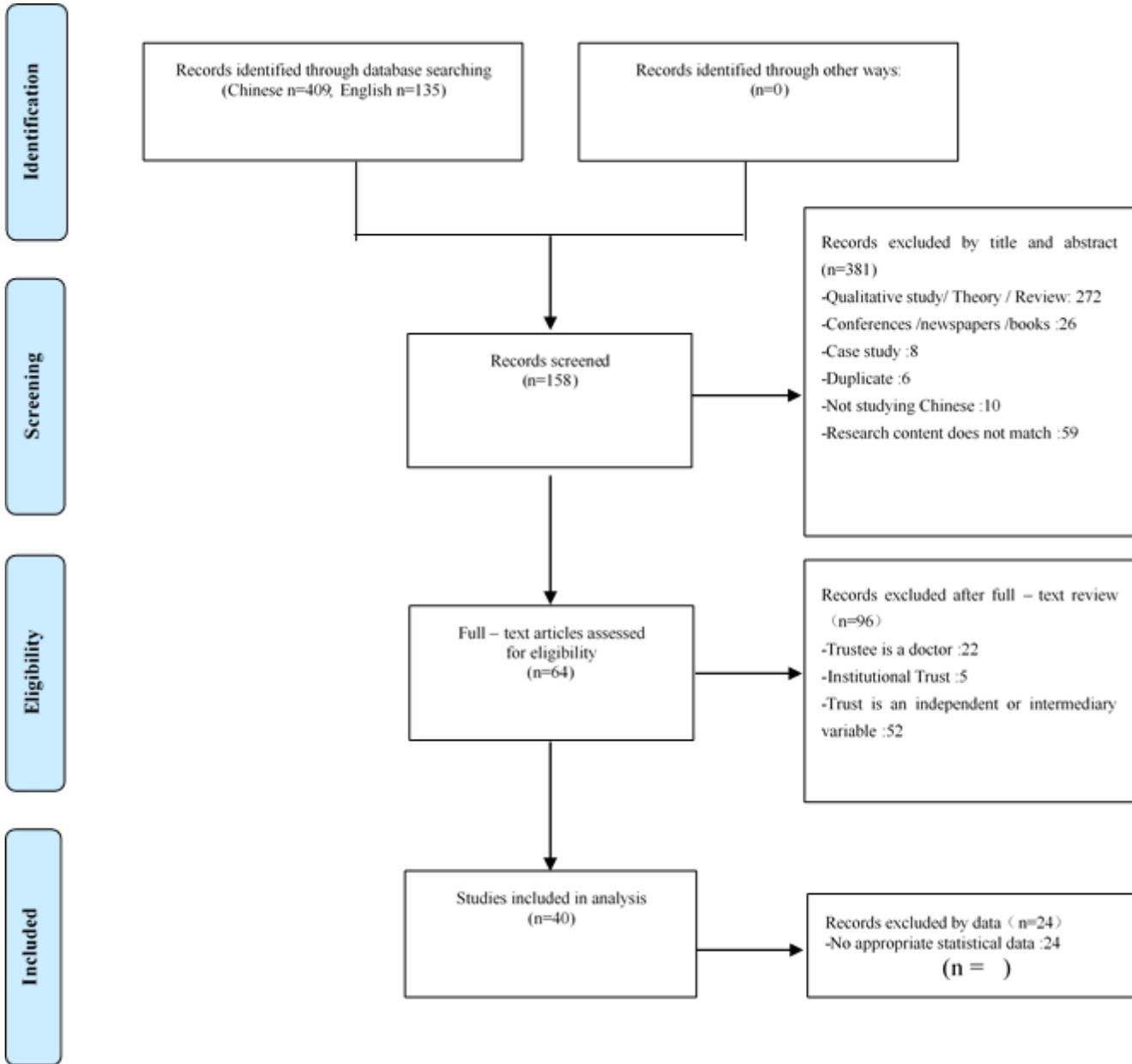


Figure 1

Flow of literature through the review

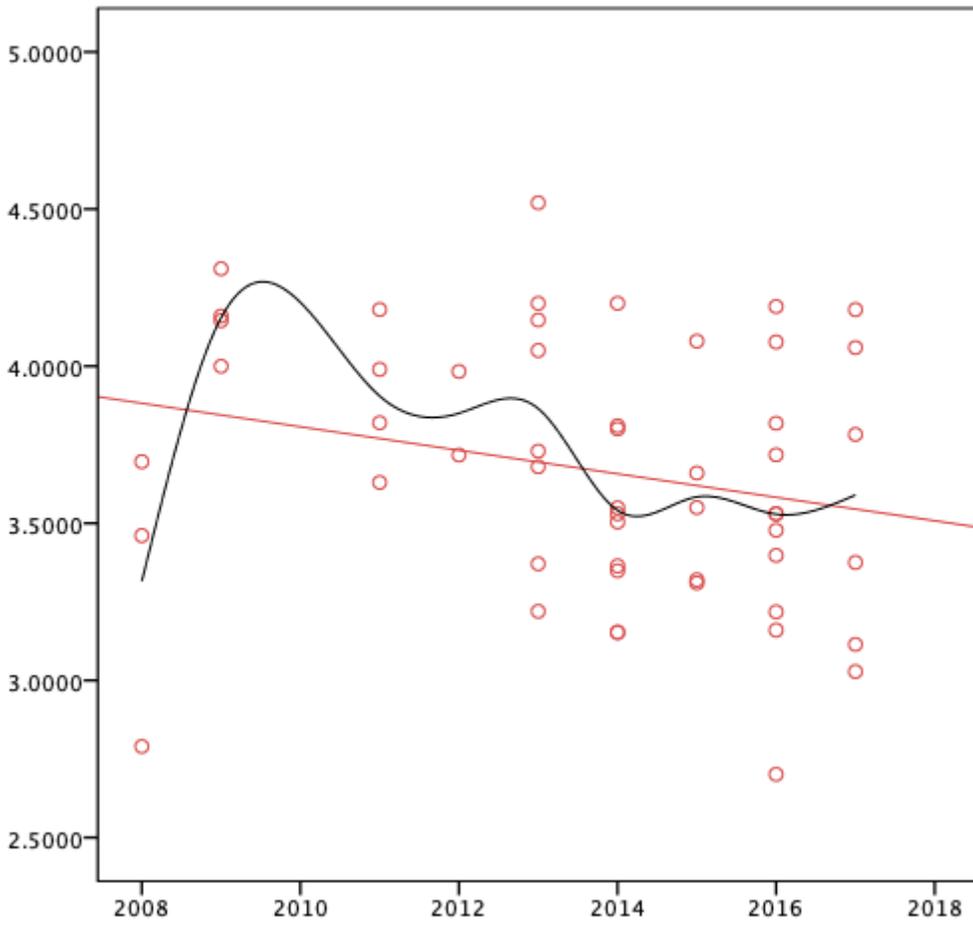


Figure 2

Correlation between total trust scores and year of data collection

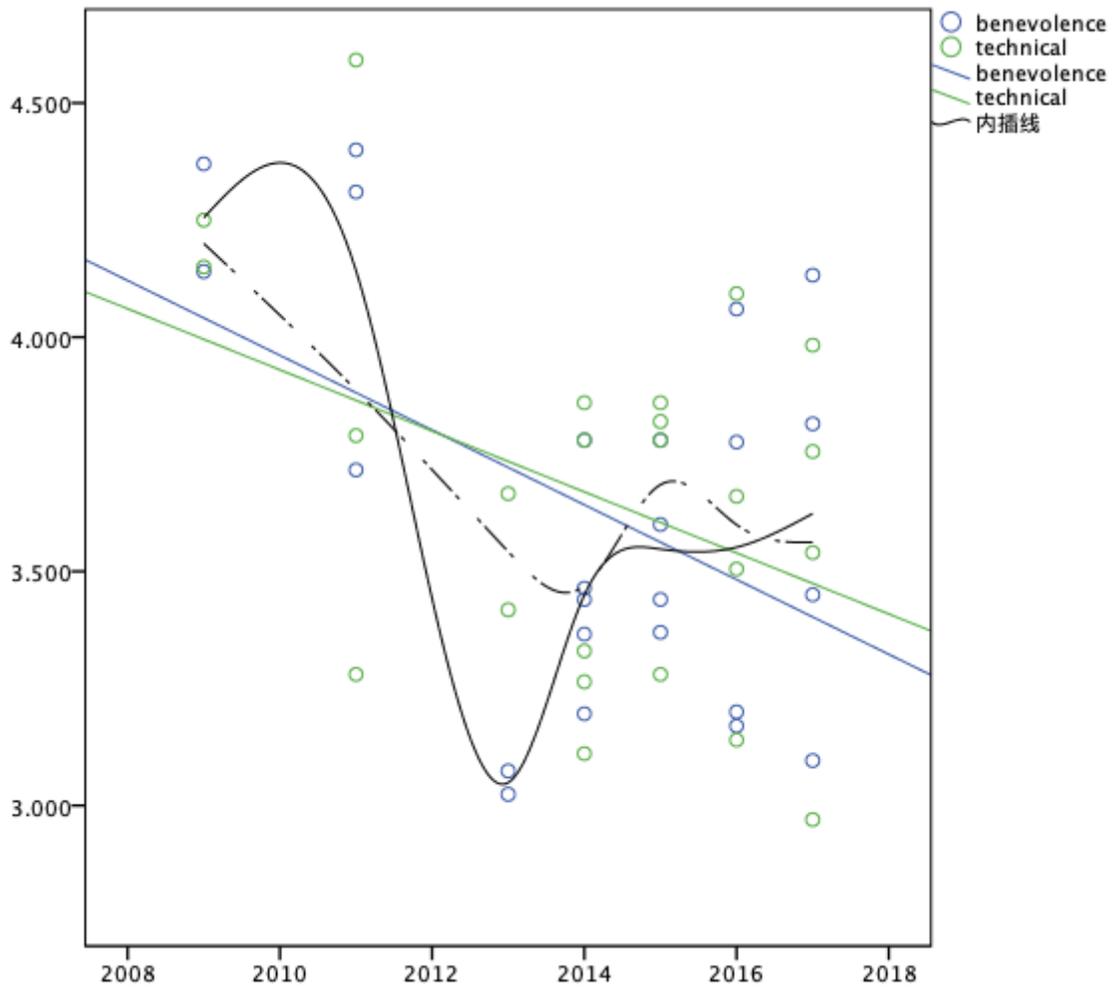


Figure 3

Correlation between benevolence trust, technical trust scores and year of data collection

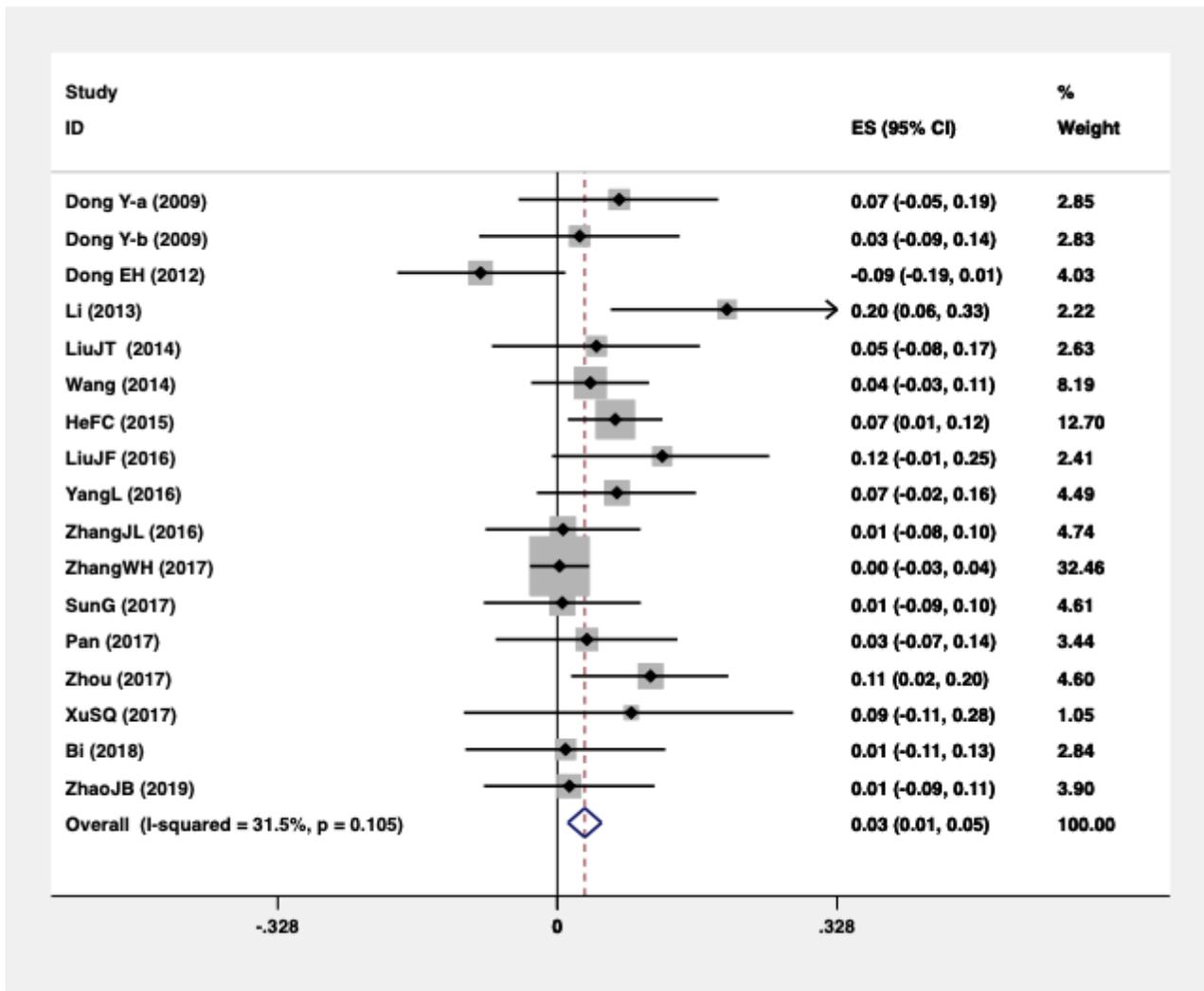


Figure 4

Forest plot showing associations between patient's trust and gender

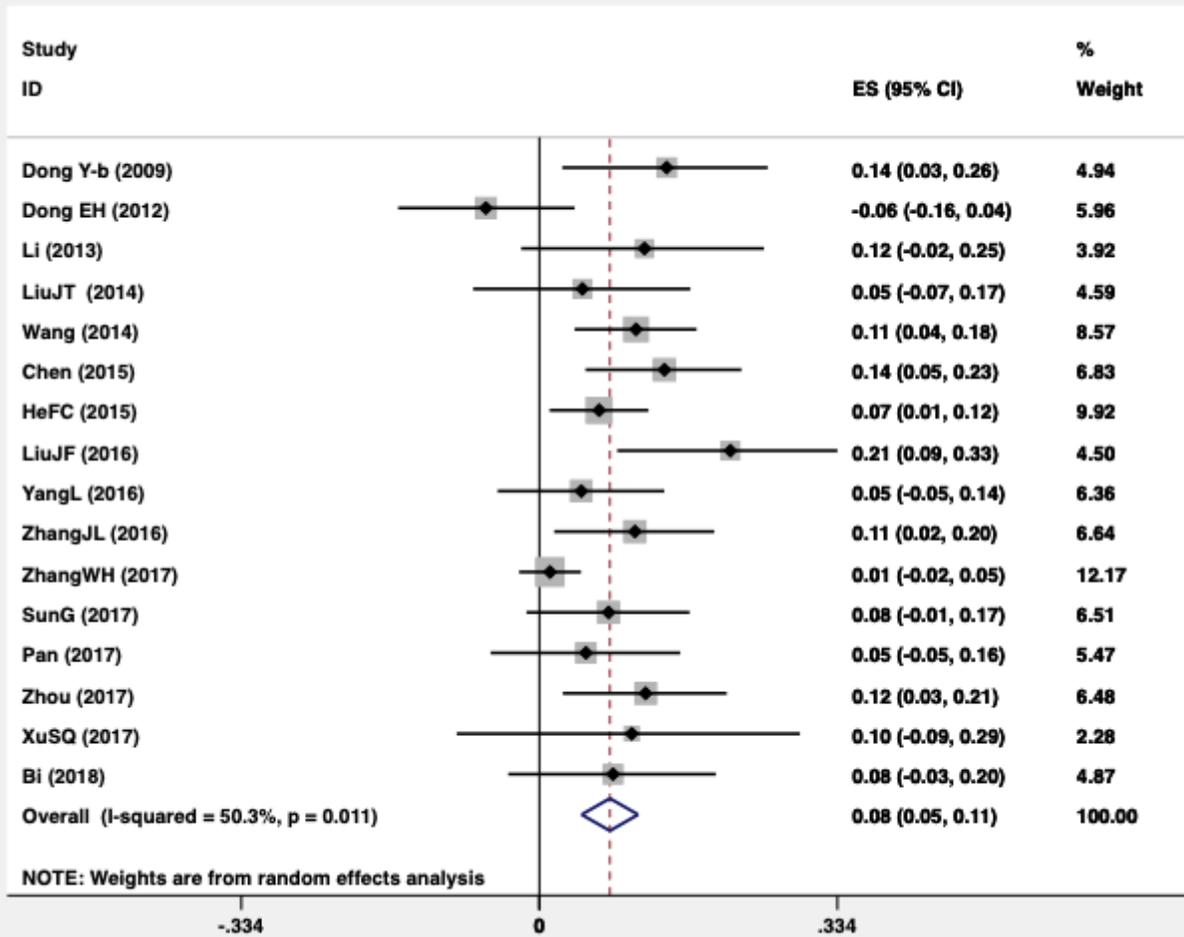


Figure 5

Forest plot showing associations between patient's trust and age

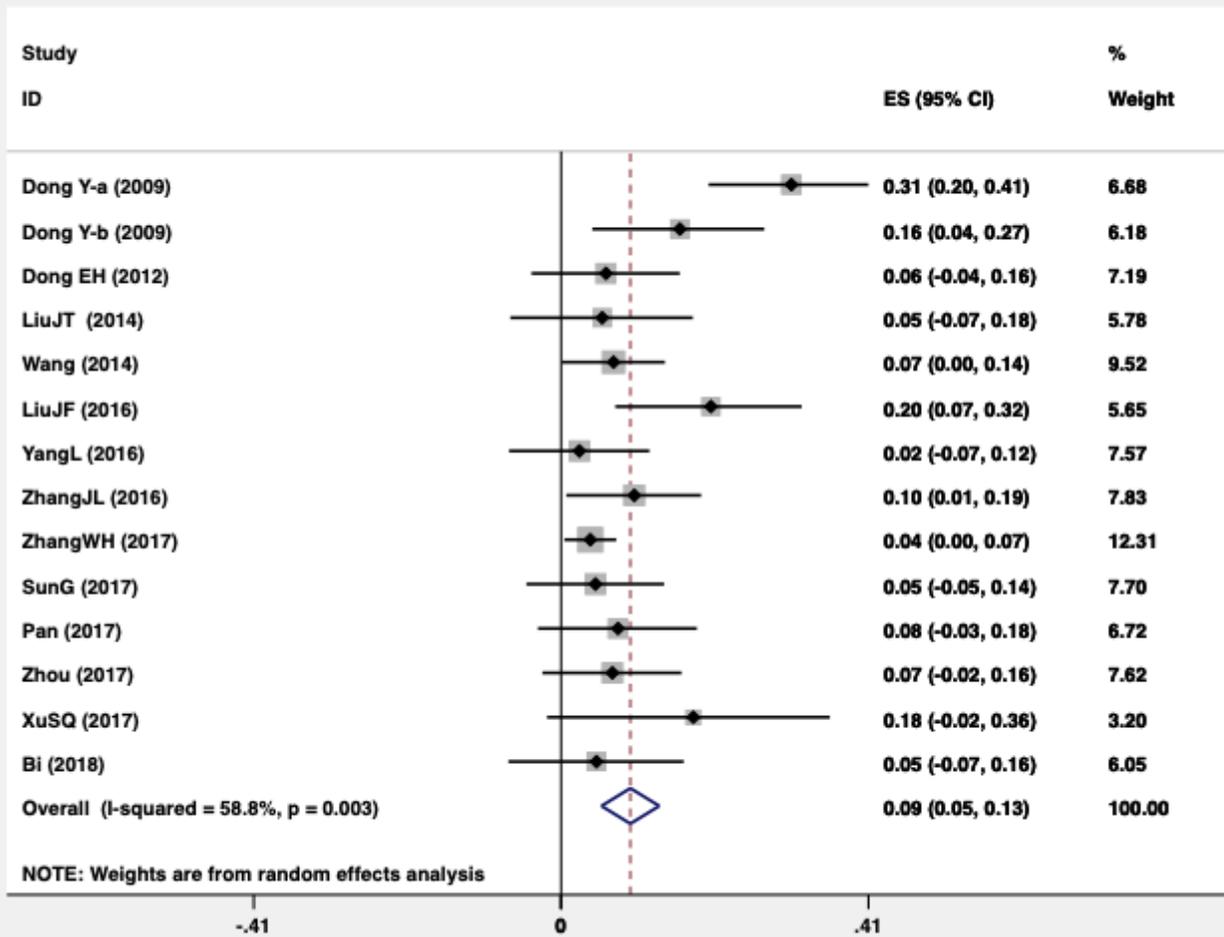


Figure 6

Forest plot showing associations between patient's trust and education