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Meta-Analysis
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Meta Analysis the Effects of Completeness of Laboratory Tests and Medicine Supplies on Patient's Satisfaction Level in Hospital

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ABSTRACT

Background: Satisfaction is a feeling that arises when someone gets a service, this feeling can be in the form of pleasure or disappointment. Service satisfaction at the hospital is very dependent on the patient, if the patient receives poor service then the patient tends to be dissatisfied with the service he gets, so that it can affect the quality of the hospital. This study aimed to analyze the effects of the completeness of laboratory tests and drugs availability on the patient satisfaction in hospital.
Subjects and Method: This was a systematic review and meta-analysis with PICO model. Population: patients visiting the hospital. Intervention: completeness of laboratory tests and drug availability. Comparison: incomplete laboratory tests and no drugs available. Outcome: patient satisfaction. Data collection from databases Google Scholar, PubMed, Science Direct, and Spinger Link. The inclusion criteria used were full papers, cross sectional study, using English language, and published during 2012 and 2022. The keywords used are "Patient Satisfaction level" OR "Patient Satisfaction" AND "Hospital service" AND "Cross sectional". Articles were analyzed using RevMan 5.3.
Results: Meta-analysis included 14 cross-sectional studies. The completeness of the laboratory test (aOR= 2.19; 95% CI= 1.49 to 3.21; p= 0.001) and drug availability (aOR=2.41; 95% CI=1.15 to 5.03; p= 0.002) increased patient satisfaction.
Conclusion: Completeness of laboratory tests and drug availability increase patient satisfaction.

Keywords: completeness of laboratory tests, drug availability.

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BACKGROUND

Health is a condition of a healthy body both mentally and physically, can make everyone live productively economically and socially (Ministry of Health RI, 2009). The world of health is currently experiencing rapid development and has good prospects, a health service that plays an important role in providing services is a hospital (Christasani and Satibi, 2016).

Hospital is a health facility that can provide complete health services. It is important

for hospitals to improve the quality of service for the better, because it can improve the health status of the community. Quality hospital services refer to professional and medical codes of ethics (Molla et al., 2022).

The laboratory is a medical support service that aims to assist doctors in diagnosing a disease, so that doctors can carry out treatment quickly, precisely and accurately. Laboratory test services are said to be of high quality, if the laboratory test results can satisfy the patient.

The key to patient satisfaction with laboratory test services is when patients get services that exceed expectations. In order to achieve good service quality, all methods must comply with the applicable Standard Operating Procedure (SOP), starting from sample preparation, sampling, sample examination to reporting laboratory test results to patients (Junjungsari et al, 2018).

According to Ekosiswoyo and Sutarto (2015) factors that can affect the quality of laboratory test services are human resources (laboratory staff), because the experience and ability of officers in examining samples affects the accuracy and speed of laboratory test results. Pharmacy installation is a service in a hospital that is used for pharmaceutical activities, under the leadership of a pharmacist and assisted by several pharmacist assistants who are responsible for their work and provide direct services to patients, both inpatients and outpatients.

Quality Hospital Pharmacy Installation (IFRS) is a service that can provide satisfaction to patients, if the services provided are in accordance with ethical standards. The pharmaceutical installation is a unit that is responsible for procuring pharmaceutical goods management, information on ready to use drugs and is responsible for pharmaceutical goods circulating in the hospital (Novaryatin et al., 2018).

In Indonesia, people are expected to get quality health services, these services are services that can meet the needs of the community which are organized according to standards. In the globalization era, what has become a success in hospital services is the level of patient satisfaction (Stefan, 2014).

Satisfaction is a feeling that arises when someone gets a service, this feeling can be in the form of pleasure or disappointment. Patients can be said to feel happy or satisfied, if the expectations with what they get are the same (Ofosu-Boateng and Acquaye, 2020). Service satisfaction at the hospital is very dependent on the patient, if the patient receives poor service then the patient tends to be dissatisfied with the service he gets, so that the hospital can lose trust and can affect patient satisfaction with the quality of the hospital. Patient satisfaction can shape perceptions and can later promote these health services to other patients. (Gong and Yi, 2018).

The completeness of laboratory tests and the availability of drugs at the hospital have an important role in the optimal service that will be given to patients. The completeness of laboratory tests and the availability of drugs can have an impact on patient satisfaction, patients feel satisfied if the laboratory tests are complete and the drugs needed are available (Santoso et al., 2021).

The purpose of this study was to analyze the effect of the completeness of laboratory tests and the availability of drugs on the level of patient satisfaction at the hospital.

SUBJECTS AND METHOD

1. Study Design

This was a systematic review and meta analysis. The search for article sources carried out by researchers relied on online article searches between 2012 to 2022. Data collection was obtained from databases

Google Scholar, PubMed, Science Direct, and Spinger Link. The keywords used "Patient satisfaction level" OR "Satisfaction level" AND "Hospital service" AND "laboratory" AND "drug availability" AND "Cross sectional". This research analysis was carried out using RevMan 5.3.

2. Steps of Meta-Analysis

Meta-analysis analysis was carried out through 5 steps as follows:

1) Formulate research questions in PICO (Population, Intervention, Comparison, Outcome).
2) Search for articles from various databases including Google Scholar, Pubmed, and Science Direct.
3) Conduct screening and critical appraisal of primary studies using the Critical Appraisal Checklist for Cross-sectional Studies from the Center for Evidence Management
4) Perform data extraction and enter the effect size of each primary study into the RevMan 5.3 application
5) Interpret the results of the research analysis and draw conclusions

3. Inclusion Criteria

The inclusion criteria used were full text articles, cross-sectional study design, adjusted odds ratio (aOR) relationship size, research subjects were outpatients at the hospital, outcome was patient satisfaction.

4. Exclusion Criteria

The exclusion criteria in this study are articles published other than English and not full paper, the article does not have a title that matches the title of the study.

5. Operational Definition

Laboratory test equipment: Laboratory examination is a procedure for carrying out examinations that can help doctors determine the diagnosis of disease. In a laboratory examination, material or samples from the patient are taken and analyzed. materials or samples can be in the form of blood, urine, sputum (sputum) and even feces (human feces).

Drug availability: Availability of drugs is the level of inventory that can be used to provide medical services in health care units. Availability and equitable supply of medicines, especially essential medicines nationally, must be guaranteed by the government.

Patient Satisfaction: The results of the assessment are in the form of emotional responses (feelings of pleasure and satisfaction) in patients due to the fulfillment of expectations or desires in using and receiving services at the hospital.

6. Research Instruments

The study instrument used in this study was the Critical Appraisal Checklist for Cross-sectional Study from the Center for Evidence Based Management (CEBMa, 2014).

7. Data Analysis

The collected articles were then processed using the Review Manager application (RevMan 5.3). Data processing is done by calculating the aOR. Forest plots and funnel plots are used to determine effect sizes and heterogeneity of data.

RESULTS

Search for articles in this study through databases that include PubMed, Google Scholar, and Science Direct. The article review process can be seen in the search flow in Figure 1.

In the process of searching for articles in the data base, it yielded 2,890 articles, after deleting published articles, 853 articles were obtained and 2,037 were filtered. Based on the filtered articles, 1,056 articles were issued and 260 articles were found to be deemed eligible. Several full text articles after the assessment did not meet the requirements as many as 87 articles. The final result of the article review was 14 articles that met the quantitative requirements for meta-analysis.

Figure 2 shows a map of the distribution of research that will be included in the meta-analysis from 2 continents consisting of the Asian continent with Pakistan, Malaysia and the African continent with Ethiopia.

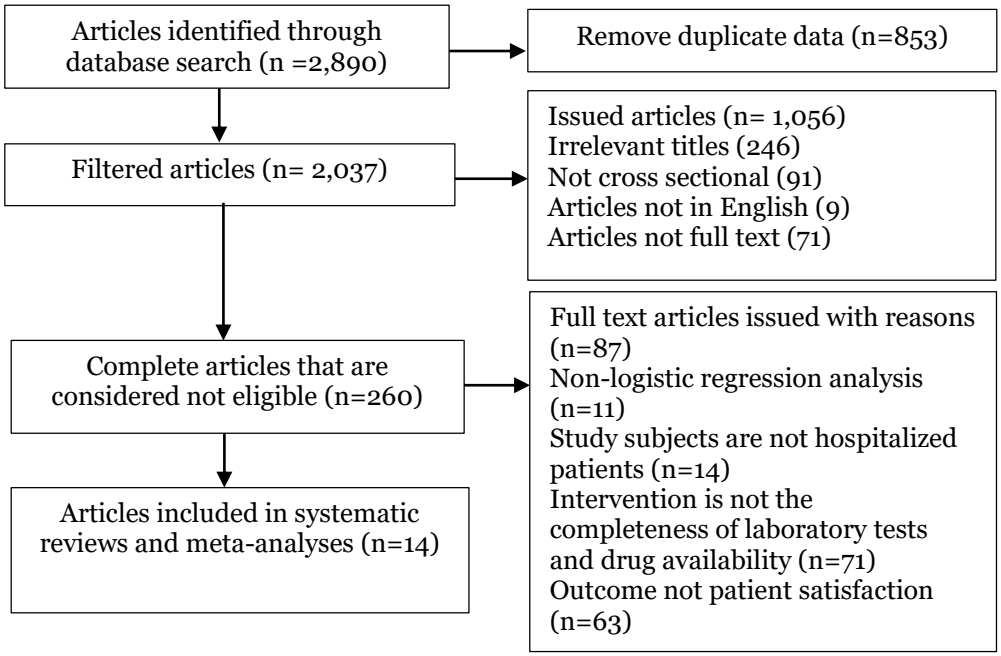

Figure 1 PRISMA flow diagram

Figure 2. Map of the distribution of research on the effect of completeness of laboratory tests and availability of drugs on patient satisfaction at the hospital

Table 1. Critical appraisal checklist for cross-sectional study dari center for evidence based management (CEBMa).

No	Author (Year)	Checklist												Total
		1	2	3	4	5	6	7	8	9	10	11	12	
1	Mindaye and Taye(2012)	1	1	1	1	1	1	1	1	1	1	1	1	12
2	Sagaro et al. (2015)	1	1	1	1	1	1	1	1	1	1	1	1	12
3	Teresa and Bekele (2016)	1	1	1	1	1	1	1	1	1	1	1	1	12
4	Garoma et al. (2017)	1	1	1	1	1	1	1	1	1	1	1	1	12

5	Yasin et al. (2017)	1	1	1	1	1	1	1	1	1	1	1	12
6	Hussain et al. (2019)	1	1	1	1	1	1	1	1	1	1	1	12
7	Mesfin et al. (2019)	1	1	1	1	1	1	1	1	1	1	1	12
8	Manzoor et al. (2019)	1	1	1	1	1	1	1	1	1	1	1	11
9	Geberu et al. (2019)	1	1	1	1	1	1	1	1	1	1	1	12
10	Eshetie et al. (2020)	1	1	1	1	1	1	1	1	1	1	1	12
11	Melesse et al. (2022)	1	1	1	1	1	1	1	1	1	1	1	12
12	Molla et al. (2022)	1	1	1	1	1	1	1	1	1	1	1	12
13	Dinsa et al. (2022)	1	1	1	1	1	1	1	1	1	1	1	12
14	Haile et al. (2022)	1	1	1	1	1	1	1	1	1	1	1	12

Note:

1 = Yes 0 = No

Description of Question Criteria:

1) Does this study address questions or problems regarding the effect of the completeness of laboratory tests and the availability of drugs on patient satisfaction at the hospital?
2) Is the research method with a cross-sectional study design suitable for answering the research problem?
3) Is the subject selection method clearly explained?
4) Does the sampling method cause bias (selection)?
5) Does the subject sample represent the population to which the findings will refer?
6) Is the sample size based on pre-study considerations of statistical power?
7) Was a satisfactory response achieved?
8) Is the research instrument valid and reliable?
9) Was statistical significance assessed?
10) Are confidence intervals given for the main results?
11) Are there any confounding factors that have not been taken into account?
12) Are the results applicable to your research?

Table 2. Table PICO summary of cross-sectional source articles on the effect of completeness of laboratory tests (n=3.402)

Author (Year)	Country	Sample	P	I	C	O
Mindaye and Taye (2012)	Ethiopia	406	Outpatient in hospital	Complete laboratory test	Incomplete laboratory tests	Patient satisfaction
Mesfin et al., (2019)	Ethiopia	266	Outpatient in hospital	Ordered laboratory tests	Incomplete laboratory tests	Patient satisfaction
Haile et al., (2022)	Ethiopia	785	Outpatient in hospital	Agree with the completeness of laboratory services	Incomplete laboratory tests	Patient satisfaction
Manzoor et al., (2019)	Pakistan	290	Outpatient in hospital	Laboratory equipment and diagnostic treatment	Incomplete laboratory tests	Patient satisfaction
Teresa and Bekele (2016)	Ethiopia	379	Outpatient in hospital	Laboratory test equipment	Incomplete laboratory tests	Patient satisfaction
Yasin et al., (2017)	Malaysia	300	Outpatient in hospital	Laboratory equipment	Incomplete laboratory tests	Patient satisfaction

Author (Year)	Country	Sample	P	I	C	O
Garoma et al., (2017)	Ethiopia	422	Outpatient in hospital	Laboratory test equipment	Incomplete laboratory tests	Patient satisfaction
Hussain et al., (2019)	Pakistan	554	Outpatient in hospital	Laboratory services	Incomplete laboratory tests	Patient satisfaction

Table 3. Data adjusted Odd Ratio (aOR) the effect of completeness of laboratory tests (n=3.402)

Author (Year)	aOR	95%CI	
		Lower Limit	Upper Limit
Mindaye and Taye (2012)	2.36	1.26	4.42
Mesfin et al., (2019)	1.33	0.70	2.53
Haile et al., (2022)	12.83	6.78	24.28
Manzoor et al., (2019)	1.12	1.03	1.22
Teresa and Bekele (2016)	3.56	2.87	4.42
Yasin et al., (2017)	5.29	1.62	17.27
Garoma et al., (2017)	0.90	0.50	1.62
Hussain et al., (2019)	1.39	1.26	1.54

Table 1 shows the assessment of the quality of primary articles using CEBMa used in this study. Based on the results obtained, the total scores of the 14 selected primary studies ranged from 12. This indicates that the quality of all primary articles used in this study is worthy of meta-analysis.

Table 2 presents a summary of the source articles obtained by 8 primary articles with a cross-sectional study design used for meta-analysis on the effect of workload on job satisfaction in health workers. The total sample is 3,402 samples.

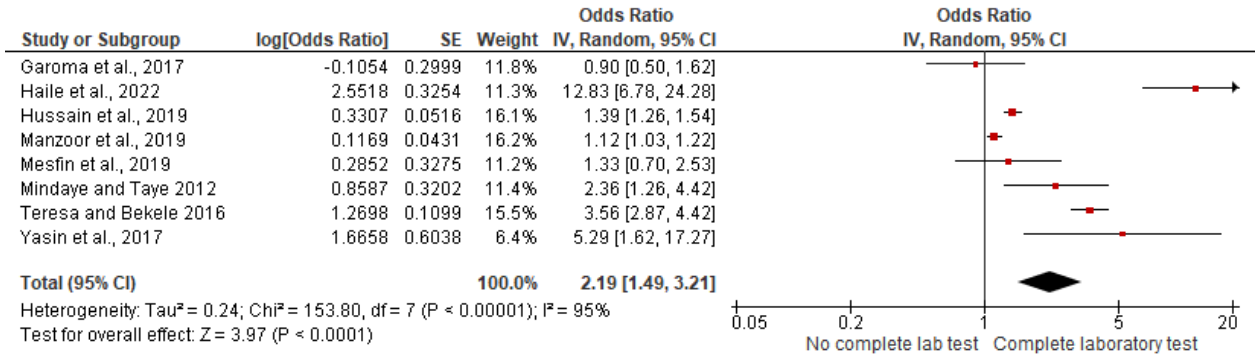

Figure 3. Forest plot of the effect of completeness of laboratory tests on patient satisfaction

a. Forest plot

Forest plot Figure 3 shows that the effect of completeness of laboratory tests on the level of patient satisfaction in the hospital is 2.19 times that of incomplete laboratory tests in the hospital (aOR=2.19; 95% CI= 1.49 to 3.21; p<0.001). Heterogeneity in the study showed (I^2 = 95%). Thus the calculation of the average effect estimate is carried out using the random effect model approach.

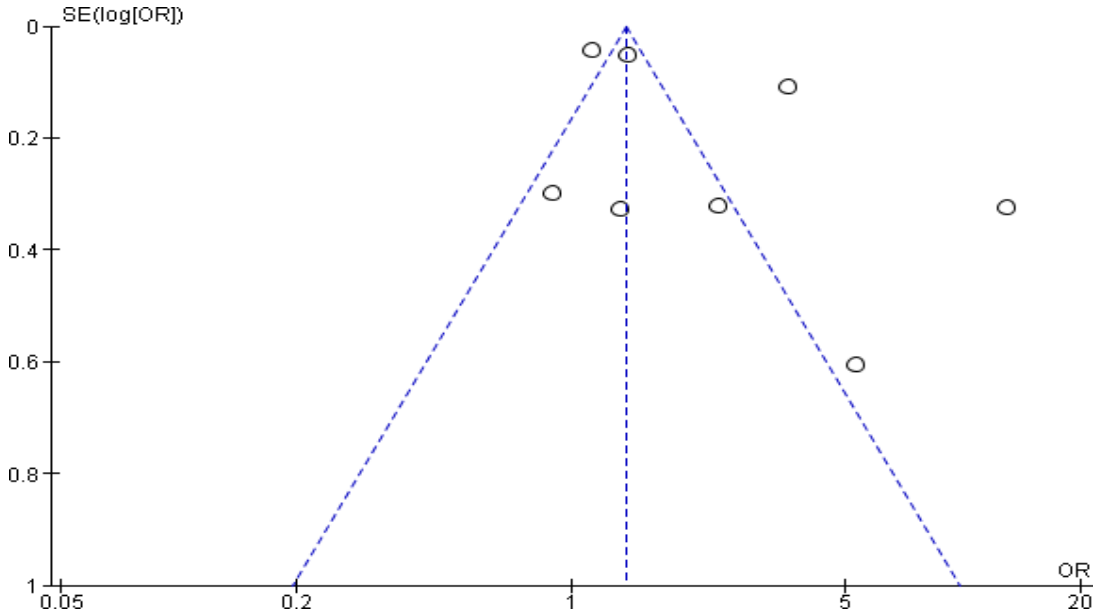

Figure 4. Funnel plot of the effect of the completeness of laboratory tests on the patients satisfaction

b. Funnel plot

The funnel plot in Figure 4 shows the distribution of effect estimates that are not symmetrical. The distribution of effect estimates lies more to the right of the vertical average line of estimates, thus indicating that there is publication bias, so this publication bias tends to overestimate the true effect.

Table 4. Table PICO summary of cross-sectional source articles on the effect of drug availability on the level of patient satisfaction (n = 4.497)

Author (Year)	Country	Sample	P	I	C	O
Molla et al., (2022)	Ethiopia	401	Outpatients in Hospital	The medicine needed is available	No Drugs Available	Patient satisfaction
Melesse et al., (2022)	Ethiopia	419	Outpatients in Hospital	Medication ordered	No Drugs Available	Patient satisfaction
Eshetie et al., (2020)	Ethiopia	413	Outpatients in Hospital	Drug availability	No Drugs Available	Patient satisfaction
Dinsa et al., (2022)	Ethiopia	431	Outpatients in Hospital	Access to pharma-ceutical drug services in hospitals	No Drugs Available	Patient satisfaction
Sagaro et al., (2015)	Ethiopia	421	Outpatients in Hospital	Availability of prescription drugs	No Drugs Available	Patient satisfaction
Mesfin et al., (2019)	Ethiopia	266	Outpatients in Hospital	Drug availability	No Drugs Available	Patient satisfaction
Haile.,et al., (2022)	Ethiopia	785	Outpatients in Hospital	Get prescribed medication	No Drugs Available	Patient satisfaction
Garoma et al. (2017)	Ethiopia	422	Outpatients in Hospital	Outpatients in Hospital	No Drugs Available	Patient satisfaction
Yasin.,et al., (2017)	Malaysia	300	Outpatients in Hospital	Drug availability	No Drugs Available	Patient satisfaction
Geberu et al., (2019)	Ethiopia	955	Outpatients in Hospital	Drug availability	No Drugs Available	Patient satisfaction

Table 5. Data adjusted Odd Ratio (aOR) the effect of drug availability on the level of patient satisfaction (n = 4.497)

Penulis	aOR	Batas Atas	Batas Bawah
Molla et al., (2022)	1.96	0.50	6.25
Melesse et al.,(2022)	1.01	0.32	3.13
Eshetie et al., (2020)	6.6	2.73	16.3
Dinsa et al., (2022)	2.3	1.08	4.9
Sagaro et al., (2015)	2.27	1.3	4.0
Mesfin et al., (2019)	2.28	0.58	8.94
Haile et al., (2022)	8.75	4.56	16.78
Garoma et al., (2017)	2.0	0.1	3.1
Yasin et al., (2017)	3.99	1.35	11.7
Geberu et al., (2019)	1.47	0.52	4.16

From table 4 it is known that the observational study used as a source of meta-analysis came from the country of Ethiopia with a total sample of 10 articles of 4,813. The population in the study in the article is outpatients at the hospital. The intervention studied in this research article is drug availability.

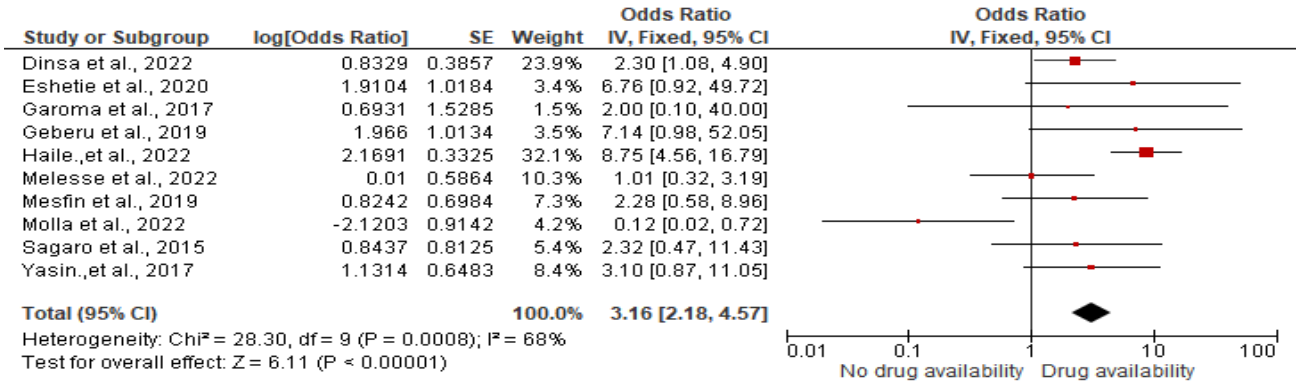

Figure 5. Forest plot of the influence of drug availability on the level of patient satisfaction at the hospital

a. Forest plot

The forest plot in Figure 5 shows that there is an effect of drug availability on the level of patient satisfaction at the hospital and this effect is statistically significant. Drug availability can increase patient satisfaction 2.41 times compared to the unavailability of drugs at the hospital (aOR= 2.41; 95% CI= 1.15 to 5.03; p= 0.002). Heterogeneity in this study shows I^2= 68%, thus the calculation of the average effect estimate is carried out using the random effect model approach.

b. Funnel plot

The funnel plot in Figure 6 shows the distribution of effect estimates that are not symmetrical. The distribution of effect estimates lies more to the left of the line than the average vertical, thus indicating publication bias. Because the distribution of effect estimates is mostly located to the left of the average vertical line of estimates in the funnel plot, while the diamonds in the forest plot of figure 5 are located to the right of the vertical line, the publication bias tends to overestimate the true effect (under estimate).

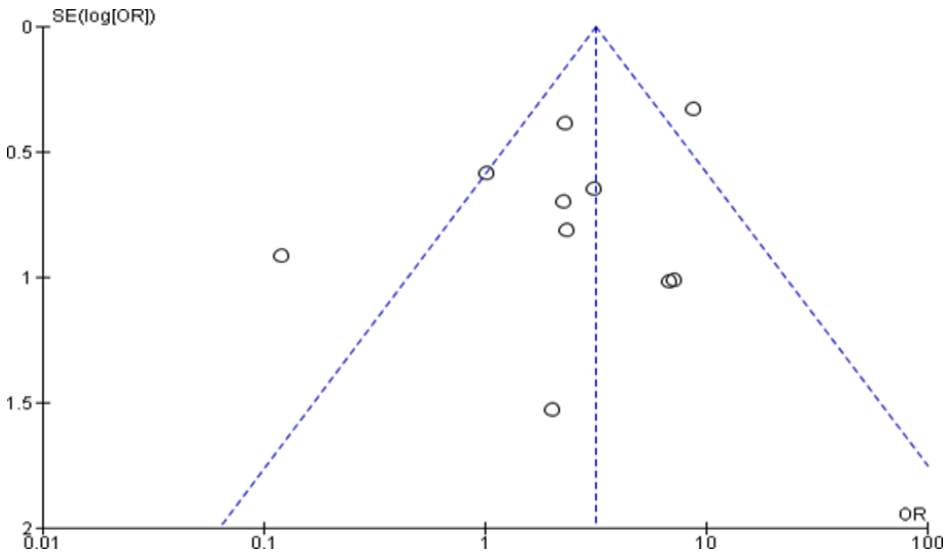

Figure 6. Funnel plot of the influence of drug availability on the level of patient satisfaction at the hospital

DISCUSSION

The effect of the completeness of laboratory tests on the patient satisfaction

A meta-analysis included 8 primary cross sectional studies concluded that there was an effect of the completeness of laboratory tests on the patient satisfaction.

Complete laboratory tests increased patient satisfaction 2.19 times compared to incomplete laboratory tests at the hospital (aOR= 2.19; 95% CI=1.49 to 3.21; p <0.001). The results obtained based on the forest plot showed heterogeneity between studies (I^2=95%; p<0.001), thus the calculation of the average effect estimate was carried out using a random effect model approach. The funnel plot shows publication bias.

The results of this study are in line with research conducted by Yasin et al, (2017). This study aims to determine the factors that affect patients towards services at specialist medical centers. The sample in this study was 300 patients, the age of the patients ranged from 9-75 years with an average of 41 years. The research design is cross-sectional. The prevalence of completeness of laboratory tests in this study was 6.4% (aOR= 5.29; 95% CI= 1.62 to 17.27). One of the factors that can affect patient satisfaction is the completeness of laboratory tests at the hospital.

A study by Teresa and Bekele (2016) on patients in Ethiopian hospitals examined patient satisfaction with general medical laboratory services at Shene Gibe Hospital with 379 research subjects. It reported that patients were satisfied with the completeness of laboratory tests at the hospital and could improve satisfaction by 3.56 times compared to incomplete laboratory test facilities (aOR= 3.56; 95% CI= 2.87 to 4.42).

It is important to improve the quality of services provided in the hospital laboratory to meet patient expectations.

The effect of drug availability on the patient satisfaction

This meta-analysis concluded that there was an effect of drug availability on the level of patient satisfaction at the hospital. The availability of drugs increases patient satisfaction 2.41 times compared to the unavailability of drugs at the hospital.

Garoma et al. (2017) on outpatients in Ethiopia who examined patient satisfaction and the factors that influenced it in outpatient care at Adama hospital with 422 outpatients as study subjects and using a cross-sectional

method. The results of this study indicate that patients feel the availability of the requested drug and the requested laboratory test can provide satisfaction. Availability of drugs 2 times increases patient satisfaction and completeness of laboratory tests 0.90 times increases patient satisfaction.

Research Molla et al. (2022) of 401 outpatients at the Debre Tabor comprehensive hospital pharmacy Addis Ababa showed that low drug availability reduced patient satisfaction (aOR= 0.12; 95% CI= 0.02 to 0.72).

AUTHOR CONTRIBUTION

Ayunda Prisilia Kusuma Ningtyas is the main researcher who selects topics, searches for and collects articles, analyzes data and writes manuscripts. Didik Tamtomo and Hanung Prasetya helped analyze data and review research documents.

CONFLICT OF INTEREST

There was no conflict of interest in the study.

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