

Effects of Social Support, Perceived Threat, and Witnessing Death on the Risk of Post-Traumatic Stress Disorder: Meta-Analysis

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Received: 8 May 2023; Accepted: 11 June, 2023; Available online: 16 July, 2023

ABSTRACT

Background: Post-traumatic Stress Disorder (PTSD) is an anxiety disorder that can develop after exposure to horrific events and experience a series of reactions after repeated trauma, stress, and scary thoughts. The risk of PTSD is influenced by several factors such as social support, perceived threat, and witnessing death. This study aimed to estimate the effect of social support, perceived threat, and witnessing death on the risk of PTSD using a meta-analysis of primary studies.

Subjects and Method: This was a systematic review and meta-analytic study. This study used the PICO model. The meta-analytic study was carried out by searching for articles from databases in electronic form using Google scholar, PubMed, and Elsevier. An article search was conducted from 1 to 28 February 2023. The keywords used were “Post-traumatic Stress Disorder” OR “PTSD” AND “Social Support” AND “Witnessing death” AND “Perceiving threat” AND “Multivariate” AND “Cross-Sectional”. The inclusion criteria for this study were complete articles using cross-sectional research, published in 2013-2023. Analysis of the articles in this study used RevMan 5.3 software.

Results: A total of 22 cross-sectional studies from North America, South America, Europe, Africa and Asia were selected for this study. Social support has a lower risk of experiencing PTSD by 0.38 times compared to people who do not receive social support (aOR=0.38; 95% CI= 0.18 to 0.77; p= 0.007). People with perceived threats have a risk of experiencing PTSD by 2.29 times compared to people without perceived threats (aOR= 2.29; 95% CI= 1.58 to 3.33; p<0.001). People who witness death have a risk of experiencing PTSD by 1.63 times compared to people who do not witness death (aOR= 1.63; 95% CI= 1.23 to 2.15; p<0.006).

Conclusion: Social support can significantly reduce the risk of PTSD. Perceived threat and witnessing death can significantly increase the risk of PTSD.

Keywords: PTSD, post-traumatic stress disorder, social support, perceived threat, witnessing death

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Cite this as:

Karima FH, Demartoto A, Murti B (2023). Meta-Analysis: Effects of Social Support, Perceived Threat, and Witnessing Death on the Risk of Post-Traumatic Stress Disorder. J Epidemiol Public Health. 08(03): 396-409. <https://doi.org/10.26911/jepublichealth.2023.08.03.10>.



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BACKGROUND

Post-traumatic Stress Disorder (PTSD) or post-traumatic stress disorder is a mental

disorder that causes permanent distress that makes individuals feel powerless or scared after facing threatening situations. Indivi-

duals are unable to get rid of anxiety about the traumatic events experienced so that the memory experiences flashbacks of these experiences (Yetter and Masten, 2022). Several events are factors that cause PTSD, namely natural disasters, sudden death of loved ones, seeing death at work, sexual violence, torture, etc. (ISTSS, 2020). World Mental Health (WMH) states that the prevalence of PTSD is reported in Australia (7.30%), USA (6.90%), Netherlands (4.40%), New Zealand (6.10%), Ukraine (4.80%), Lebanon (3.40%), Colombia (3.70%), Ireland (8.80%), South Africa (2.30%), Japan (1.30%), Italy (2.40%), and Spain (2.20%) (Koenen et al., 2017).

Treatment of PTSD in health systems has not adequately responded to the needs of people with mental disorders and is significantly under-resourced. The gap between the need for treatment and its provision is wide worldwide and often of poor quality. For example, only 29% of people with psychological disorders and only a third of people with depression receive formal mental health care (WHO, 2021).

Individuals who get low social support tend to have 2 times the risk of suffering from PTSD compared to individuals who get strong social support. Individuals who receive low social support may find it difficult to develop appropriate coping strategies after trauma (Yohannes et al., 2018). Some literature states that there is an influence between PTSD risk and social support, loss, perception of threat, witnessing death, and other traumatic events (Asnakew et al., 2019). Based on the existing literature, summary statistics are needed to estimate the effect of social support, perceived threat, and witnessing death on PTSD risk. This study aimed to analyze previous primary studies in assessing the effect of social support, perceived threat, and witnessing death on PTSD risk.

SUBJECTS AND METHOD

1. Study Design

This Meta-analysis was carried out using the PRISMA flowchart using Google Scholar, PubMed, and Elsevier databases published from 2013 to 2023. The keywords used were “Post-traumatic Stress Disorder” OR “PTSD” AND “Social Support” AND “Witnessing death” AND “Perceived threat” AND “Multivariate” AND “Cross-Sectional”. There were 22 studies with a cross-sectional study design that met the inclusion criteria. Analysis was performed with RevMan 5.3.

2. Steps of Meta-Analysis

The meta-analysis was carried out through 5 steps as follows:

- 1) Formulate research questions using the PICO model. P= people with traumatic experiences; I= social support, threat perception, and witnessing death; C= low social support, no perceived threat, and no death witness; O= PTSD.
- 2) Searching for primary study research articles from databases.
- 3) Conduct screening and quality assessment of primary research articles
- 4) Extract and analyze data into RevMan 5.3 software.
- 5) Interpret the results and draw conclusions.

3. Inclusion Criteria

This research article is a full-text paper with a cross-sectional design that analyzed the effect of social support, perceived threat, and witnessing death on the risk of PTSD. The influence measure used is the OR. Analysis used multivariate with adjusted odds ratio (aOR) and published articles in English.

4. Exclusion Criteria

The articles were not in English, the study design was not cross-sectional, and the articles were published before 2013.

5. Operational Definition of Variables

PTSD: is an anxiety disorder that can develop after horrific events and experience a

series of reactions after trauma such as having stress and frightening thoughts.

Social support: is information or feedback provided by other people to individuals that influences the psychology of individuals so that they feel loved, valued, cared for, respected, and involved in communication and mutual obligations.

Perceived threat: a person's response in facing a threat, can also be interpreted as an individual's cognitive assessment of the dangers in an environment.

Witnessing death: an experience that causes psychosocial reactions in someone's life.

6. Study Instruments

The quality assessment of the main articles in this study used a critical assessment checklist for cross-sectional studies published by the Joanna Briggs Institute (JBI).

7. Data Analysis

The articles in this study were collected using the PRISMA diagram and analyzed using the Review Manager 5.3 application

(RevMan 5.3) by calculating the effect size and heterogeneity (I^2) to determine the combined research model and form the final results of the meta-analysis. The results of data analysis are presented in the form of forest plots and funnel plots.

RESULTS

The process of searching for articles was carried out through several journal databases which include Google Scholar, PubMed, and Elsevier. The article review process can be seen in the PRISMA flow diagram in Figure 1. The study related to influence of social support, perceived threats, and witnessing death on the risk of PTSD consisted of 22 articles.

The initial search process obtained 61,540 articles, after the deletion process 2,470 articles were obtained, of which 586 met the requirements for further full-text review, 22 articles that met the quality assessment were included in the quantitative synthesis meta-analysis.

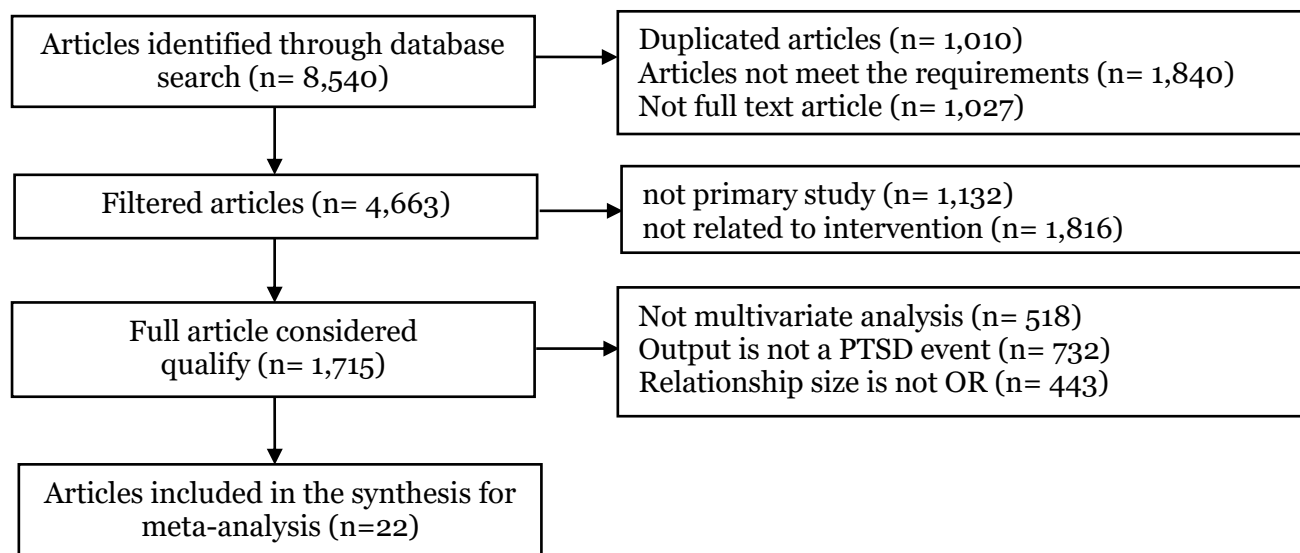


Figure1. PRISMA Flow Diagram

It can be seen in Figure 2 that research articles came from several continents namely North America (USA), South

America (Peru), Europe (Sweden), Asia (China and Nepal), and Africa (Ethiopia, Uganda and Tanzania).



Figure 2. Map of the research area of the influence of social support, perceived of threat, and witnessing death to PTSD risk

Table 1. Critical appraisal checklist for cross-sectional studies in meta-analysis

Primary Study	Criteria of Questions								Total
	1	2	3	4	5	6	7	8	
Ali et al. (2022)	2	2	2	2	2	2	1	2	15
Kassaye et al. (2022)	2	2	2	2	2	2	1	2	15
Dahal et al. (2018)	2	2	2	2	2	2	1	2	15
Asnakew et al. (2019)	2	2	2	2	2	2	1	2	15
Anbesaw et al. (2019)	2	2	2	2	2	2	1	2	15
Caramanica et al. (2015)	2	2	2	2	2	2	1	2	15
Acharya et al. (2017)	2	2	2	2	2	2	1	2	15
Bezabh et al. (2018)	2	2	2	2	2	2	1	2	15
Yohannes et al. (2016)	2	2	2	2	2	2	1	2	15
Kabunga dan Okalo (2021)	2	2	2	2	2	2	1	2	15
Tamir et al. (2022)	2	2	2	2	2	2	1	2	15
Kabunga et al. (2022)	2	2	2	2	2	2	1	2	15
Njiro et al. (2020)	2	2	2	2	2	2	1	2	15
Moller et al. (2014)	2	2	2	2	2	2	2	2	16
Levey et al. (2017)	2	2	2	2	2	2	2	2	16
Si et al. (2023)	2	2	2	2	2	2	2	2	16
Duko et al. (2020)	2	2	2	2	2	2	2	2	16
Alenko et al. (2022)	2	2	2	2	2	2	2	2	16
Tedla (2022)	2	2	2	2	2	2	2	2	16
Madoro et al. (2020)	2	2	2	2	2	2	2	2	16
Makango et al. (2023)	2	2	2	2	2	2	2	2	16
Taye (2022)	2	2	2	2	2	2	2	2	16

Description of the question criteria:

- 1 = Are the criteria for inclusion in the sample clearly defined?
- 2 = Are the research subjects and settings described in detail?
- 3 = Is exposure measured in a valid and reliable way?
- 4 = What are the standard criteria used for objective condition measurement?
- 5 = Are confounding factors identified?
- 6 = Is a strategy for dealing with confounding factors stated?
- 7 = Are the results measured in a valid and reliable way?
- 8 = Has proper statistical analysis been used?

Description of the answer score:

- 0 = No
- 1 = Hesitate
- 2 = Yess

Table 2. PICO table of cross-sectional summary articles with primary study sources by sample size (n= 27,686)

Author (year)	Country	Sample size	P	I	C	O
Ali et al. (2020)	Ethiopia	10	18-65 years	High Social Support, High Perceived life threat	Poor Social support, Low Perceived life threat	PTSD
Kassaye et al. (2022)	Ethiopia	609	18-45 years	Poor Social Support, Witnessing murder family/friend/others	Strong Social Support, No Witnessing murder family/friend/others	PTSD
Dahal et al. (2018)	Nepal	535	18-40 years	High Social Support, Witnessing death	Low Social Support, No witnessing death	PTSD
Asnakew et al. (2019)	Ethiopia	830	15-40 years	Strong Social Support, High Perceived life threat, Witnessing death family/friend/others	Poor Social Support, Low Perceived life threat, No Witnessing death family/friend/others	PTSD
Anbesaw et al. (2022)	Ethiopia	821	18-44 years	Poor Social Support, High Perceived life threat, Witness the death of a family member	Strong Social Support, Low Perceived life threat, No Witness the death of a family member	PTSD
Caramanica et al. (2015)	USA	4,137	18-65 years	High Social Support	Low Social Support	PTSD
Acharya et al. (2017)	Nepal	800	7-16 years	High Psychosocial Support	Low Psychosocial Support	PTSD
Bezabh et al. (2018)	Ethiopia	396	18-45 years	Strong Social Support	Poor Social Support	PTSD
Yohannes et al. (2018)	Ethiopia	531	20-40 years	Good Social Support	Poor Social Support	PTSD
Kabunga and Okalo (2021)	Uganda	636	20-40 years	Social Support	No Social Support	PTSD
Tamir et al. (2022)	Ethiopia	422	8-18 years	High Social Support	Low Social Support	PTSD
Kabunga et al. (2022)	Uganda	587	18-40 years	Social Support	No Social Support	PTSD
Njiro et al. (2021)	Tanzania	550	21-40 years	High Social Support	Low Social Support	PTSD

Author (year)	Country	Sample size	P	I	C	O
Moller et al. (2014)	Sweden	317	>18 years	High Perceived life threat	Low Perceived life threat	PTSD
Levey et al. (2017)	Peru	2,920	10-35 years	High Perceived life threat, Witnessing death	Low Perceived life threat, No witnessing death	PTSD
Si et al. (2021)	China	2,205	16-25 years	High Perceived life threat	Low Perceived life threat	PTSD
Duko et al. (2020)	Ethiopia	205	18-45 years	Negative life event	Positive life event	PTSD
Alenko et al. (2019)	Ethiopia	402	20-60 years	Witnessing death during accident	No Witnessing death during accident	PTSD
Tedla (2022)	Ethiopia	612	18-30 years	Witnessed a friend being injured or killed	No Witnessed a friend being injured or killed	PTSD
Madoro et al. (2020)	Ethiopia	636	15-55 years	Witnessing murder of family or friend	No Witnessing murder of family or friend	PTSD
Makango et al. (2023)	Ethiopia	406	18-65 years	Witnessing murder of family or friend	No Witnessing murder of family or friend	PTSD
Taye (2022)	Ethiopia	830	18-44 years	Witnessed murder of loved ones	No Witnessed murder of loved ones	PTSD
Ali et al. (2020)	Ethiopia	10	18-65 years	High Social Support, High Perceived life threat	Poor Social support, Low Perceived life threat	PTSD

Table 3. Adjusted Odds Ratio (aOR) data on the effect of social support on PTSD risk

Author (Year)	aOR	95%CI	
		Lower Limit	Upper Limit
Ali et al. (2020)	1.13	0.60	2.11
Kassaye et al. (2022)	3.10	1.60	6.04
Dahal et al. (2018)	71.34	13.85	367.46
Asnakew et al. (2019)	3.60	2.00	6.70
Anbesaw et al. (2022)	1.12	0.63	2.02
Caramanica et al. (2015)	5.50	3.30	9.30
Acharya et al. (2017)	1.70	1.10	2.60
Bezabh et al. (2018)	2.23	0.79	6.26
Yohannes et al. (2018)	2.10	1.34	3.46
Kabunga and Okalo (2021)	0.55	0.39	0.60
Tamir et al. (2022)	8.97	4.04	19.91
Kabunga et al. (2022)	2.27	1.52	3.38
Njiro et al. (2021)	28.04	8.42	93.37

Forest plot Figure 3 showed that there was an effect of social support on the incidence of PTSD and this effect was statistically significant. People who receive social support have a lower risk of experiencing PTSD by 0.38 times compared to people who do not receive social support (aOR= 0.38; 95% CI= 0.18 to 0.77; p= 0.007). The forest plot in Figure 3 showed variations in effect estimates with heterogeneity I²= 93%; p<0.001). The calculation of average

effect estimate was carried out using the random effect model approach.

The funnel plot in Figure 4 showed the asymmetrical distribution of effect estimates. The distribution of effect estimates was more to the right of the estimated average vertical line, thus indicating publication bias. Because the distribution of effect estimates placed more to the right of the vertical line of the average estimate in the funnel plot which was the same as

the average effect estimate in the forest plot which was located on the right, the

publication bias tends to overestimate the true effect.

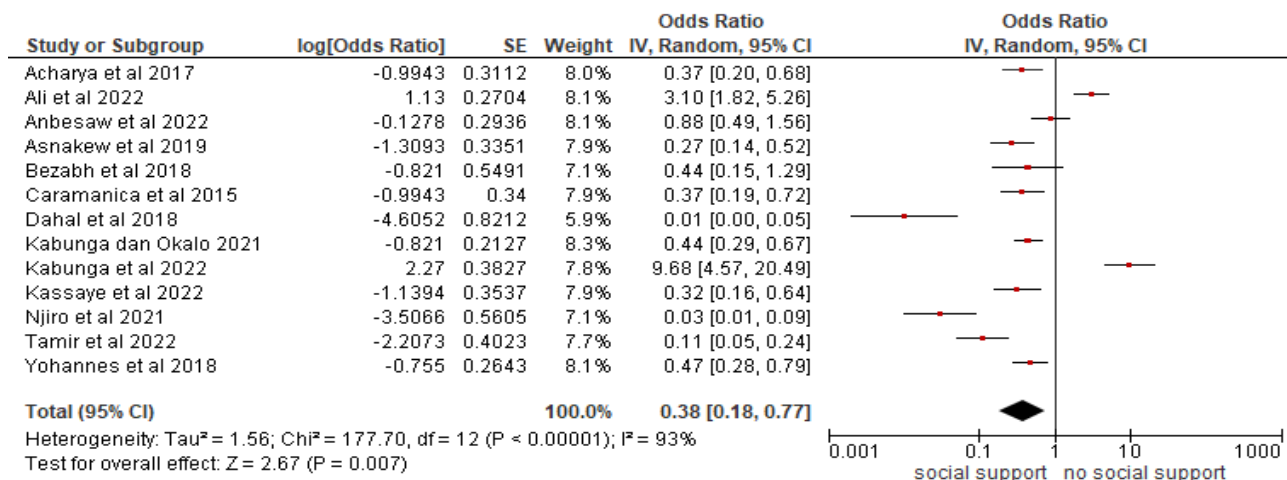


Figure 3. Forest Plot of the effect of social support on PTSD risk

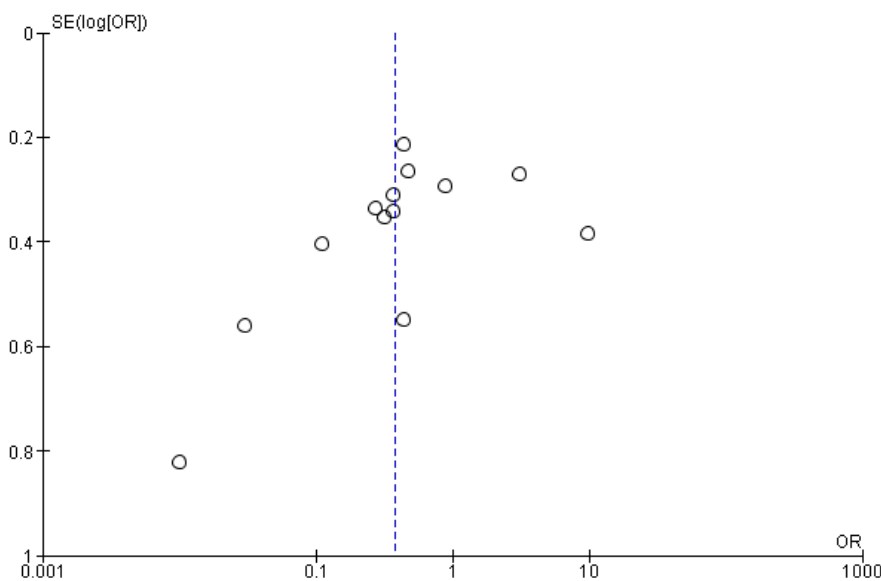


Figure 4. Funnel Plot of the effect of social support on PTSD risk

Table 4. Adjusted Odds Ratio (aOR) data on the effect of perceived threat on PTSD risk (n= 7,308)

Author (Year)	aOR	95 % CI	
		Lower limit	Upper limit
Ali et al. (2020)	3.66	1.93	6.96
Asnakew et al. (2019)	3.10	1.40	6.60
Anbesaw et al. (2022)	5.73	3.05	10.78
Moller et al. (2014)	1.34	0.60	3.89
Levey et al. (2017)	1.30	1.11	1.51
Si et al. (2021)	2.46	1.29	1.22
Duko et al. (2020)	1.76	1.41	6.98

Forest Plot in Figure 5 showed that there was an effect of perceived threat on the incidence of PTSD and this effect was statistically significant. People with perceived threats have a risk of experiencing PTSD by 2.29 times compared to people without perceived threats (aOR= 2.29; 95% CI= 1.58 to 3.33; $p < 0.001$). The forest plot in Figure 5 showed variations in effect estimates with heterogeneity ($I^2 = 82\%$; $p < 0.001$). The calculation of the average effect estimate was carried out using random effect model approach.

The funnel plot in Figure 6 showed the asymmetric distribution of effect estimates. The distribution of effect estimates was more to the right of the estimated average vertical line, thus indicating publication bias. Because the distribution of effect estimates was located to the right of the average vertical line in the funnel plot which was the same as the average effect estimate in the forest plot which was located on the left, the publication bias tends to over-estimate the true effect.

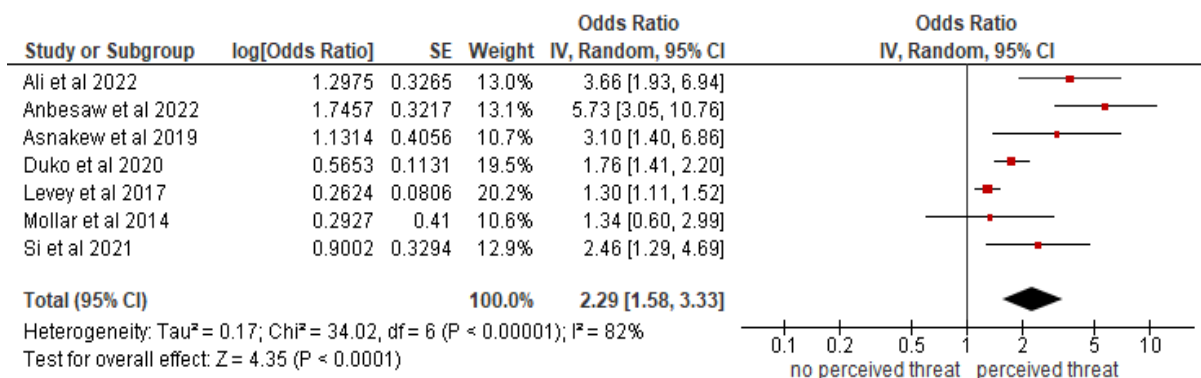


Figure 5. Forest Plot of the Effect of perceived threat on PTSD risk

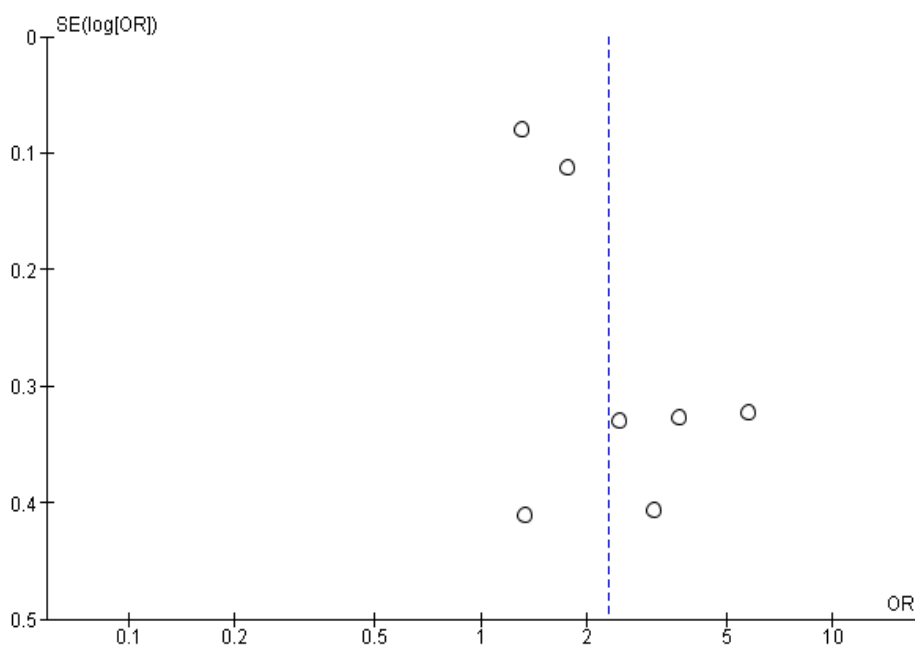


Figure 6. Funnel Plot of the Effect of perceived threat on PTSD risk

Table 5. Adjusted Odds Ratio (aOR) data on the effect of witnessing death on the risk of PTSD

Author (Year)	aOR	95% CI	
		Upper Limit	Lower Limit
Kassaye et al. (2022)	1.6	1.01	2.71
Dahal et al. (2018)	5.41	1.44	20.26
Asnakew et al. (2019)	0.8	0.5	1.4
Anbesaw et al. (2022)	1.12	0.25	4.95
Alenko et al. (2019)	3.31	0.96	5.66
Tedla (2022)	1.17	0.62	2.23
Madoro et al. (2020)	2.1	1.08	4.08
Makango et al. 2023)	1.26	0.78	2.04
Levey et al. (2017)	1.77	1.45	2.15
Taye (2022)	3.28	1.58	6.79

Forest plot Figure 7 showed that there was an effect of witnessing death on the incidence of PTSD and this effect was statistically significant. People who witness death have the risk of experiencing PTSD by 1.63 times compared to people who do not witness death (aOR= 1.63; 95% CI= 1.23 to 2.15; p= 0.006). The forest plot in Figure 7 showed variations in effect estimates with heterogeneity ($I^2=56%$; $p<0.020$). The calculation of average effect estimate was carried out using random effect model.

The funnel plot in Figure 8 showed the asymmetric distribution of effect estimates. The distribution of effect estimates was more to the right of the estimated average vertical line, thus indicating publication bias. Because the distribution of effect estimates was located to the right of the average vertical line in the funnel plot which was the same as the average effect estimate in the forest plot which was located on the left, the publication bias tends to over estimates the true effect

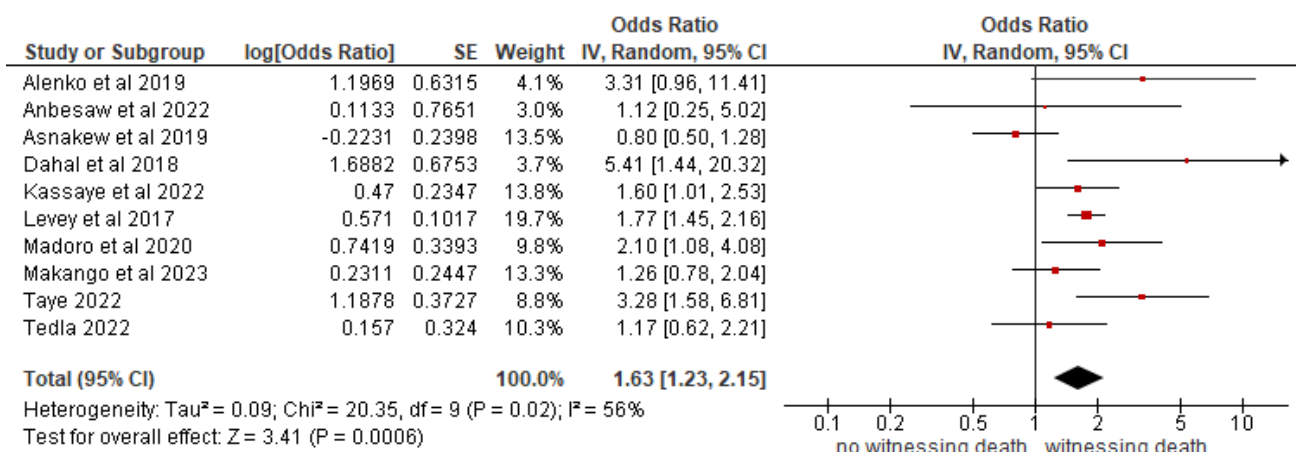


Figure 7. Forest Plot of the effect of witnessing death on the risk of PTSD

DISCUSSION

PTSD is a mental disorder that causes permanent distress that makes individuals feel helpless or scared after facing threatening situations. Individuals are unable to get rid

of anxiety about the traumatic events experienced so that the memory experiences flashbacks of these experiences (Yetter and Masten, 2022). Several events are factors that cause PTSD, namely natural disasters,

sudden death of loved ones, seeing death at work, sexual violence, torture, etc. (ISTSS, 2020).

Individuals who get low social support tend to have the risk of suffering from PTSD by 2 times compared to individuals who get strong social support. Individuals who receive low social support may find it

difficult to develop appropriate coping strategies after trauma (Yohannes et al., 2018). Some literature states that there is an influence between PTSD risk and social support, loss, threats, witnessing death, and other traumatic events (Asnakew et al., 2019)

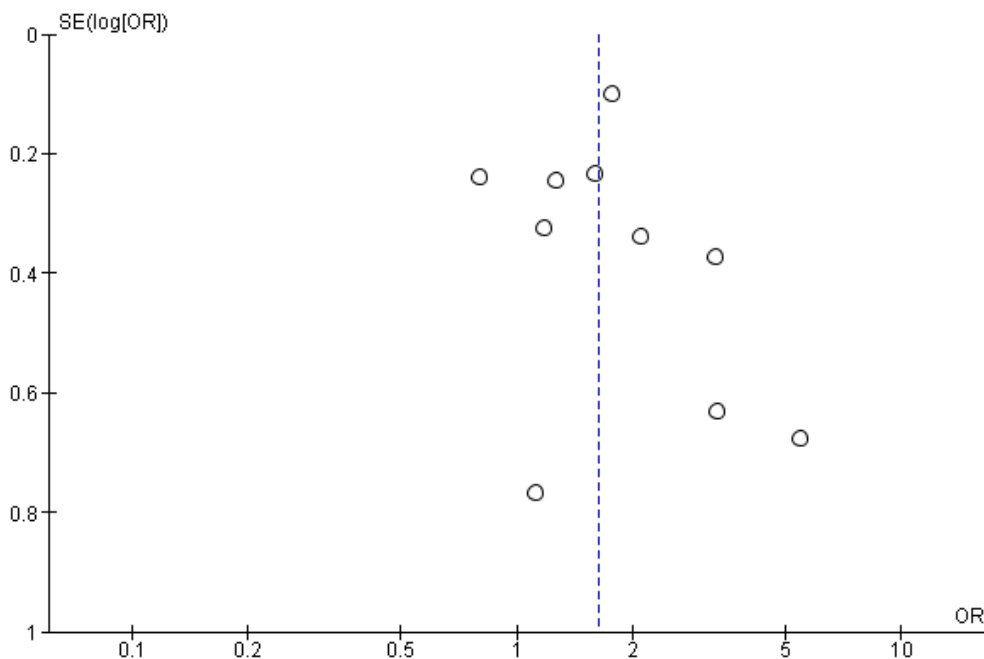


Figure 8. Funnel Plot of the effect of witnessing death on the risk of PTSD

This systematic review research and meta-analysis raised the theme of the effect of social support, perceived threat, and witnessing death on the risk of PTSD. The dependent variable analyzed was PTSD. The independent variables analyzed are social support, perceived threat and witnessing death.

1. Effect of social support on the risk of PTSD

A total of 13 observational research articles with a cross-sectional study design as a source of meta-analysis of the effect of social support on PTSD risk were obtained. This study shows that there is an effect of social support on the incidence of PTSD and this effect is statistically significant. People who

receive social support have a lower risk of experiencing PTSD by 0.38 times compared to people who do not receive social support (aOR= 0.38; 95% CI= 0.18 to 0.77; p=0.007). The heterogeneity of the research data shows $I^2= 93%$ so that the spread of the data is stated to be heterogeneous.

This study is in line with low social support are 2 times more likely to have PTSD compared to those with strong social support. This circumstance also means that positive and adequate support can mitigate the negative effects of a traumatic event. The presence of social support is considered one of the best protective factors against the development of PTSD. Strong social support from partners, family, and friends is signi-

ificantly associated with better treatment outcomes for PTSD. However, on the contrary, low social support will effect on worse mental health and PTSD conditions become more severe (Kabunga et al., 2022).

Therefore, social support is needed to protect individuals from the negative effects of traumatic events. High social support means of psychological recovery in overcoming PTSD through sharing positive emotions (Dahal et al., 2018).

2. Effect of perceived threat on the risk of PTSD

A total of 7 observational research articles with a cross-sectional study design as a source of meta-analysis of perceived threat on PTSD risk were obtained. This study shows, there is an effect of perceived threat on the incidence of PTSD and this effect is statistically significant. People with perceived threats have a risk of experiencing PTSD 2.29 times compared to people without perceived threats (aOR= 2.29; 95% CI= 1.58 to 3.33; p= 0.001). The heterogeneity of the research data shows $I^2 = 82\%$ so that the spread of the data is stated to be heterogeneous. According to Anbesaw et al., (2022), PTSD develops in individuals with a higher perceived threat by 5 times compared to individuals with low perceived threat.

The feeling of being threatened causes difficulties in adapting to the environment, interacting with other people, and avoiding interactions and self-involvement in a community so that it significantly increases the risk of developing PTSD (Duko et al., 2020). These feelings will cause the accumulation of long-term negative emotions and it leads to PTSD symptoms such as intrusion, avoidance, and hyperarousal (Si et al., 2021).

3. Effect of witnessing death on the risk of PTSD

A total of 10 observational research articles with a cross-sectional study design as a source of meta-analysis of the effect of wit-

nessing death on the risk of PTSD were obtained. This study shows that there is an effect of witnessing death on the incidence of PTSD and this effect is statistically significant. People who witness death have a 1.63 times risk of experiencing PTSD compared to people who do not witness death (aOR= 1.63; 95% CI= 1.23 to 2.15; p= 0.006). The heterogeneity of the research data shows $I^2 = 56\%$ so that the spread of the data is stated to be heterogeneous.

This study is also in accordance with the results presented by (Madoro et al., 2022) which sated that witnessing the death of a family or friend were 2 times more likely to have a risk of experiencing PTSD compared to those who do not experience and witness it. The effect of losing a loved one is a factor that may also cause other disorders such as the desire for revenge and emotional disturbances so that the risk of PTSD increases.

Meanwhile, witnessing the death of other people, such as a study conducted by Alenko et al. (2022) also stated that witnessing death during an accident has 3.31 times the risk of PTSD compared to individuals who did not witness death. Witnessing death has a relationship with depression, a traumatic event will cause the brain to remain in a state of hypervigilance and lead to behavioral disorders. Increased emotional stress causes an increase in cortisol and norepinephrine responses that cause stress and increase the likelihood of depression. Therefore, witnessing the death of a loved one has a significant relationship with increasing the potential for PTSD.

AUTHOR CONTRIBUTION

Fatimah Hasna Karima as the researcher who selected topics, searched for and collected research data. Argyo Demartoto and Bhisma Murti analyzed the data and reviewed research documents.

ACKNOWLEDGEMENT

We would like to thank the database providers namely PubMed, Google Scholar and Elsevier.

FUNDINGS AND SPONSORSHIP

The study was self-funded.

CONFLICT OF INTEREST

There is no conflict of interest in this study.

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