

Sex Differences in the Relative Risk (RR) of Death of the Attention Deficit Hyperactivity Disorder (ADHD) Patients: A Systematic Review and Meta-analysis

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ABSTRACT

Objectives: Previous studies have shown that ADHD patients have a higher risk of experiencing unnatural causes of death and natural causes of death compared to the general population. Thus, this meta-analysis is aimed to compare the RR of death in ADHD patients focusing on gender differences.

Method: A computerized search was performed for all publications available up to 30th of July, 2022 through PubMed, PsychINFO, Embase, Web of Science with keywords “attention deficit hyperactivity disorder” and “mortality” and “cohort study.”

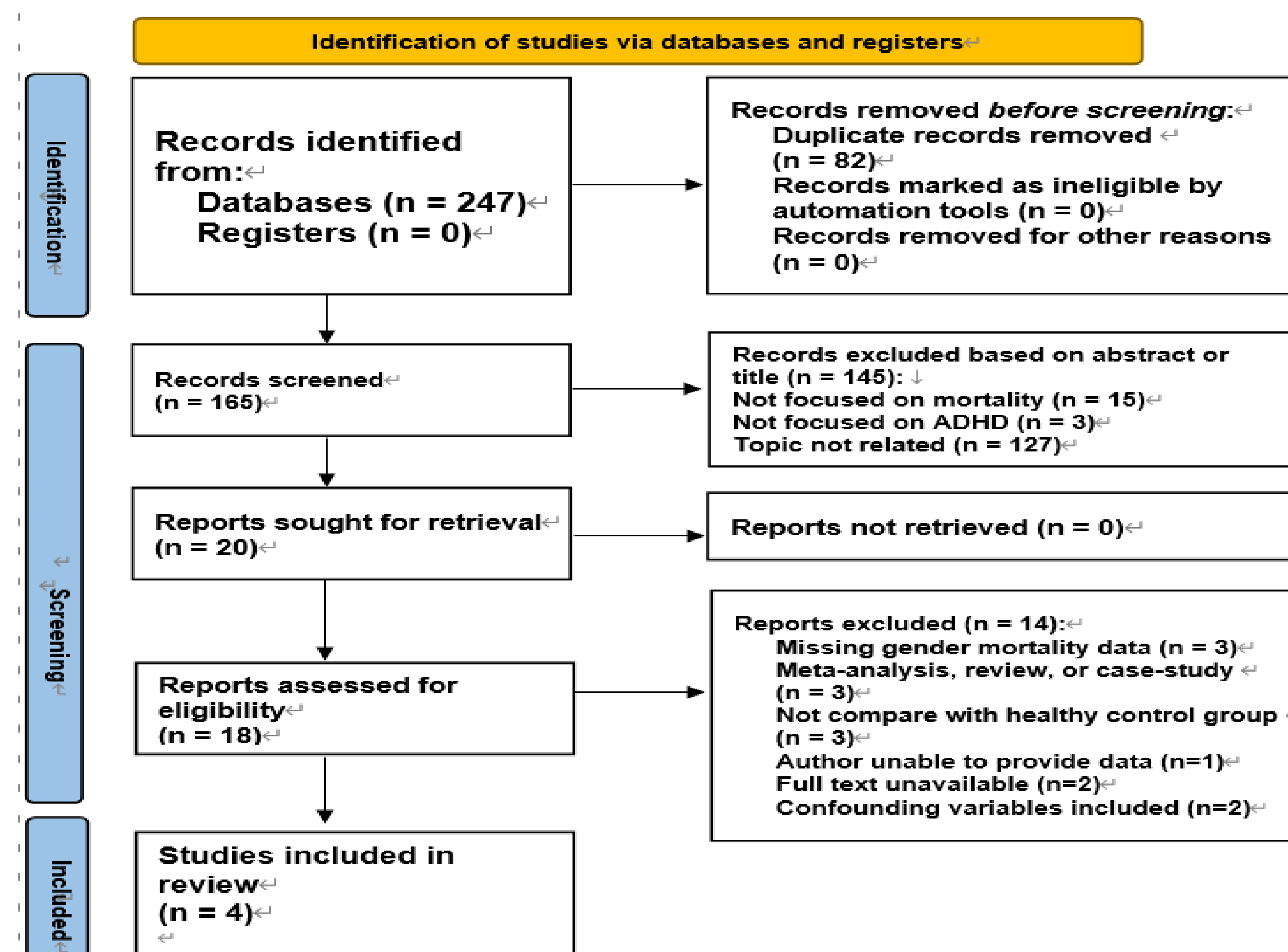
Results: Females with ADHD (RR, 1.83; 95% CI, 1.61-2.07) have a 1.83 times higher RR of death than non-ADHD females. Whereas males with ADHD have 1.63 times higher RR of death than non-ADHD males (RR, 1.63; 95% CI, 1.23-2.15).

Conclusion: This systematic review and meta-analysis show that ADHD was associated with an increased mortality risk in both males and females.

Introduction

- ADHD patients have a higher risk of experiencing mortality
 - Unnatural cause of death: suicide, unintentional injury, homicide
 - Natural cause of death: all the causes of death except for the above three

Method



Result

- The RR of death was higher for patients with ADHD than the non-ADHD population. (Fig. 1A and Table 1).
- Males with ADHD have only 1.63 higher than non-ADHD male. (Fig. 1B and Table 2)
- Females with ADHD have a 1.83 times higher RR of death than non-ADHD female. (Fig 1C and Table 2)

Figure 1. Relative Risk of ADHD Patients (A: Overall, B: Male; C: Female)

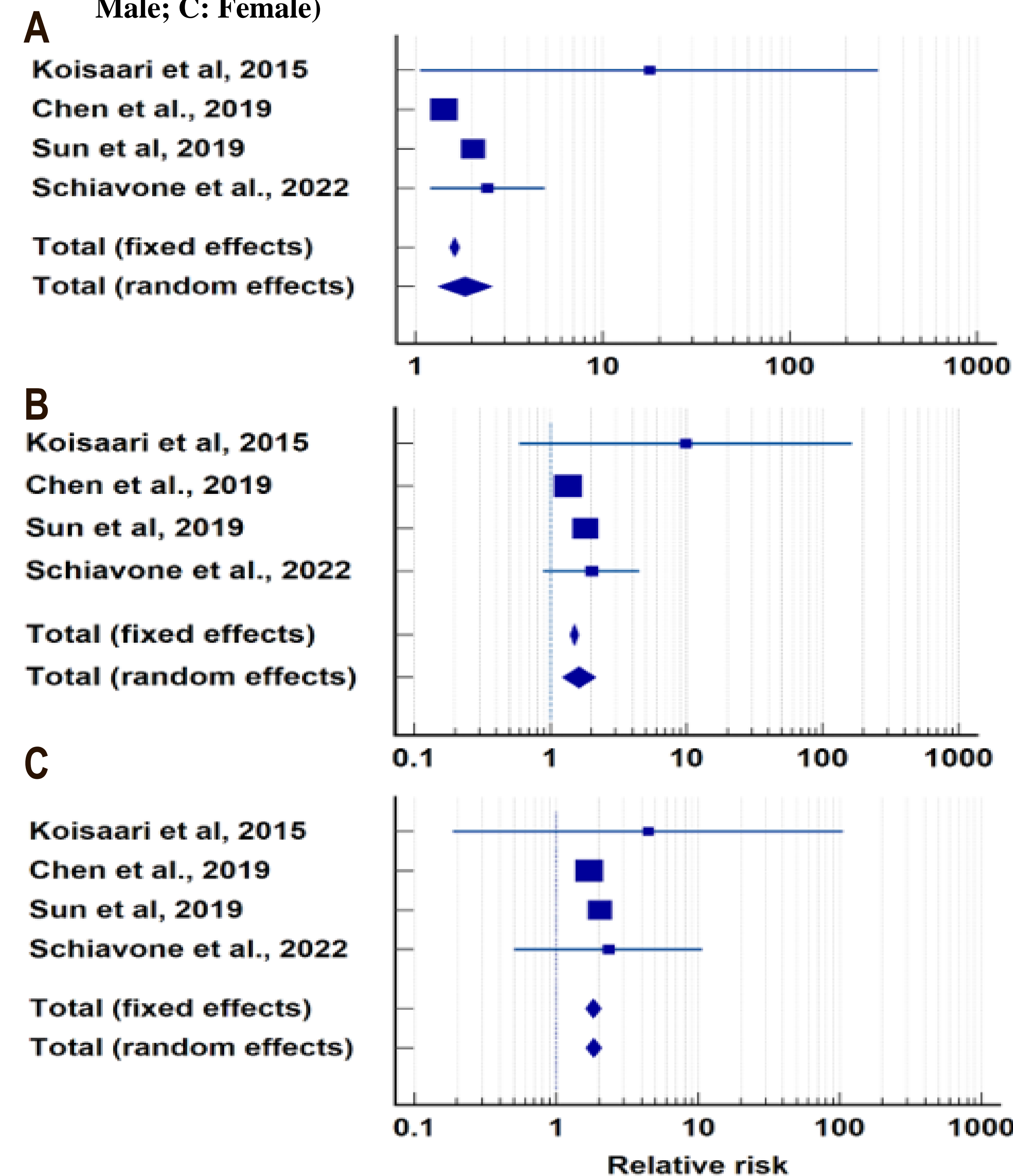


Table 1. Overall ADHD Relative Risk

References	ADHD		Non-ADHD		Relative Risk	95% CI	P	Z
	Mortality	Total	Mortality	Total				
Koisaari et al., 2015	11	122	0	94	17.764	1.060 to 297.668		
Chen et al., 2019	727	275980	3594	1931860	1.416	1.308 to 1.533		
Sun et al., 2019	424	86670	6231	2588945	2.033	1.843 to 2.242		
Schiavone et al., 2022	11	115	20	508	2.430	1.198 to 4.929		
Total (random effects)	1173	362887	9845	4521407	1.843	1.323 to 2.568	<0.001	3.614

ADHD, attention deficit hyperactivity disorder; Mortality, number of death; Total, total number of participants in the group

Table 2. Male/Female ADHD Patients Relative Risk Data

References	ADHD		Non-ADHD		Relative Risk	95% CI	P	Z
	(male/female)	Total	(male/female)	Total				
Koisaari et al., 2015	11/1	122/36	0/0	94/54	17.764/4.459	1.060 to 297.668		
Chen et al., 2019	727/181	275980/66574	3594/742	1931860/466018	1.416/1.708	1.308 to 1.533		
Sun et al., 2019	424/100	86670/28751	6231/2177	2588945/1272074	2.033/2.032	1.843 to 2.242		
Schiavone et al., 2022	11/2	115/33	20/7	508/270	2.430/2.338	1.198 to 4.929		
Total (random/fix ed effects)	117/284	362887/95394	9845/2926	4521407/1738416	1.843/1.825	1.323 to 2.568	<0.001	3.614

ADHD, attention deficit hyperactivity disorder; Mortality, number of death; Total, total number of participants in the group; P, p-value; Z, z-score. In each grid, the number at the front stands for male and the number at the back stands for female.

Conclusion

- ADHD was associated with an increased mortality risk in both male and female.