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Dermatologic Conditions and Risk of Suicide: A Case Control Study

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Abstract

Background—Patients diagnosed with skin conditions have a higher risk of comorbid psychiatric conditions and suicide related outcomes such as suicidal ideations and behaviors. There is paucity of evidence in the US general population about the risk of suicide death in patients with dermatologic conditions.

Methods—We conducted a retrospective case-control study to investigate the risk of suicide death in patients receiving care for dermatologic conditions. This study involved 8 US health systems. A total of 2,674 individuals who died by suicide (cases) were matched with 267,400 general population control individuals.

Results—After adjusting for age, sex, and any mental health or substance use condition, we did not find an association between death by suicide and any skin condition including conditions where clinicians are generally concerned about the risk such as: acne (aOR: 1.04, p: 0.814), atopic dermatitis (aOR: 0.77, p: 0.28), psoriasis (aOR: 0.91, p: 0.63).

The authors report no conflicts of interest.

IRB approval was obtained at each participating site.

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Conclusion—This case-control study provides no evidence of increased risk of suicide in individuals with major skin disorders in the US general population.

Introduction

Over the last decade, there has been a 24% increase in the United States (US) national suicide rates; the current rate of 13 per 100,000 is the highest in the last 30 years.^{1, 2} This has prompted the need to develop effective prevention strategies.³ Majority of individuals who die by suicide make health care visits before the event, but many do not receive psychiatric care before suicide death.⁴ Hence, one of the areas of emphasis and potential significant impact is implementation of suicide prevention strategies in all healthcare settings as opposed to efforts restricted to psychiatric settings⁵. Physical health conditions and associated disease burden are known to be risk factors for suicide related outcomes.^{6–10} Further, recent data from the US general population suggests increased risk of suicide death with major physical health conditions.¹¹ Given the prevalence of dermatologic conditions, associated disease burden of serious skin conditions, and the opportunity to intervene during health care visits associated with dermatology, it is pertinent to investigate the risk of suicide death in patients diagnosed with skin disorders. Patients diagnosed with conditions such as acne, psoriasis, and atopic dermatitis have been identified to have an increased risk of depression and suicidal ideations.^{12–16} While there is paucity of data on risk of suicide death with dermatologic conditions, this concern has impacted both clinical practice and research.^{17, 18}

Methods

The ongoing TUBS (Treatment Utilization Before Suicide) study, funded by the National Institute of Mental Health, is investigating the association between non-psychiatric clinical factors such as medical conditions and suicide risk.¹¹ Detailed study methods have been described previously.¹¹ Briefly, we conducted a retrospective case-control study to investigate the risk of suicide death in patients receiving care for skin disorders. This study involved 8 health systems, including: HealthPartners (Minnesota), Harvard Pilgrim Health Care (Massachusetts), Henry Ford Health System (Michigan), and Kaiser Permanente health systems in Colorado, Georgia, Hawaii, Washington and the Northwest. All of these systems provide array of primary and specialty care, and have affiliated health insurance plans. Institutional Review Board approval was obtained at each site. A total of 2,674 individuals who died by suicide (cases) from 2000–2013, were members of the participating health systems, and were continuously enrolled in the health plan for at least 10 months during the year before their death, were included in the study. Each case was matched with a randomly selected sample of 100 members, enrolled during the same period at the system, leading to a total of 267,400 general population control individuals. All cases and controls were matched by site and time period.

All participating health systems maintain electronic health record (EHR) and insurance claims data for members who are enrolled in their health plan. Data are organized similarly across all participating health systems.^{19, 20, 21} Individuals who died by suicide were identified using International Classification of Diseases, 10th revision (ICD-10) codes.

Additionally, ICD-9 codes were captured from health system encounters. Mental health and substance use conditions were identified using ICD-9 codes (290–319). Dermatologic conditions were extracted using ICD-9 codes, psoriasis (696), malignant melanoma (172), other malignant neoplasm (173), benign neoplasm (216), atopic dermatitis (691), contact dermatitis (692), erythematous conditions (695), pruritus (698), acne (706, 706.1), alopecia (704), conditions such as corns and callosities, other hypertrophic and atrophic conditions, other dermatoses, disease of nail, hair and hair follicles, sweat glands urticarial and chronic ulcer (700–709) were grouped together under Other Skin Disease. Even though acne, atopic dermatitis and psoriasis have been linked to psychiatric comorbidity, we chose to study additional commonly presenting conditions. Due to the smaller sample size (cases) for specific skin disorders we chose to group together selected conditions consistent with ICD codes. Logistic regression models were used to calculate the unadjusted and adjusted odds of suicide associated with each skin condition. Models were adjusted for age and sex and then also for mental health and substance use diagnoses. All analyses were conducted using SAS. Statistical significance was assessed with a threshold of $p < 0.05$.

Results

Overall, 619 cases and 54364 controls with skin conditions were analyzed. In the unadjusted model, psoriasis, malignant melanoma, contact dermatitis, erythematous conditions, pruritus, acne and alopecia were not associated with the increased risk of death by suicide. However, other malignant neoplasm (OR: 2.15, p : 0.001), and the other skin disease cluster (OR: 1.33, p : 0.001) were found to have an increased risk of death by suicide. Conversely, in the unadjusted model, benign neoplasm (OR: 0.57, p : 0.001) and atopic dermatitis (OR: 0.59, p : 0.028) were associated with decreased risk of death by suicide.

After adjusting for age and sex, the other skin disease cluster had an increased risk (aOR: 1.12, p : 0.028). In the model adjusted for age, sex, and any mental health or substance use condition, we did not find an association between risk of death by suicide and any skin condition including, acne (aOR: 1.04, p : 0.814), atopic dermatitis (aOR: 0.77, p : 0.28), psoriasis (aOR: 0.91, p : 0.63), or the other skin disease cluster (aOR: 0.98, p : 0.661). The negative association between the risk of death by suicide and benign neoplasm of skin (aOR: 0.53, p : 0.001) was found to be significant in the model adjusted for age, sex and any mental health or substance use condition.

Discussion

Our findings suggest no increased risk for suicide associated with most skin disorders. One surprising finding of our study is the negative association between the risk of suicide and benign neoplasm of skin (aOR: 0.53, p : 0.001). This may be due to a negative association between mental health conditions and seeking care for benign lesions or to relief associated with being diagnosed with a benign condition, where malignant neoplasm may have been in the initial differential. We identified an association between the other skin disease cluster and suicide risk, but that association was no longer significant after adjusting for mental health and substance use conditions. These findings should be interpreted in the context of limitations: First, all participants had either private or public health insurance; therefore, the

findings may not apply to uninsured individuals. Second, not all states in the U.S. or all types of health care settings were represented. Third, the study was limited to diagnoses that were documented in the year prior to suicide. Finally, not every dermatologic condition was analyzed separately. Our study has several strengths; we focused on death by suicide as the primary outcome while most of the previous evidence is limited to suicide related behaviors and suicidal ideations. Since individuals with serious dermatologic conditions are more likely to make health care visits compared to healthy individuals thereby increasing the chance of detection bias (higher chance of diagnosis with comorbid conditions), we controlled for significant factors associated with suicide: any mental health and substance use conditions in the multivariate adjusted analyses, helping eliminate an important confounding factor. Finally, to our knowledge ours is the only study that has looked at the risk of suicide with dermatologic conditions in the US general population.

Conclusion

This case-control study provides no evidence of increased risk of suicide in individuals with major skin disorders in the US general population. Given the comorbidity between dermatologic conditions and psychiatric disorders, more research is needed regarding the relationship between skin disorders and suicide related behaviors. Further studies are also needed to understand the association between suicide death and skin disorders that were not individually captured in our study. Our findings should help alleviate concerns related to suicide death among dermatology clinicians.

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References

1. Curtin, SC., Warner, M., Hedegaard, H. Increase in suicide in the United States, 1999–2014. Hyattsville, MD: National Center for Health Statistics, Centers for Disease Control and Prevention; 2016.
2. Centers for Disease Control and Prevention [CDC]. CDC National Health Report Highlights. Atlanta, GA: Centers for Disease Control and Prevention; 2014.
3. U.S. Department of Health and Human Services, Office of the Surgeon General and National Action Alliance for Suicide Prevention. National Strategy for Suicide Prevention: Goals and Objectives for Action. Washington, D.C: 2012.
4. Ahmedani BK, Simon GE, Stewart C, et al. Health care contacts in the year before suicide death. *Journal of General Internal Medicine*. 2014; 29(6):870–877.
5. Ahmedani BK, Vannoy S. National pathways for suicide prevention and health services research. *American Journal of Preventive Medicine*. 2014; 47(3S2):S222–S228. [PubMed: 25145743]
6. Webb RT, Kontopantelis E, Doran T, Qin P, Creed F, Kapur N. Suicide risk in primary care patients with major physical diseases: a case-control study. *Arch Gen Psychiatry*. 2012; 69(3):256–264. [PubMed: 22393218]
7. Juurlink DN, Herrmann N, Szalai JP, Kopp A, Redelmeier DA. Medical illness and the risk of suicide in the elderly. *Arch Intern Med*. 2004; 164(11):1179–1184. [PubMed: 15197042]
8. Robson A, Scrutton F, Wilkinson L, MacLeod F. The risk of suicide in cancer patients: a review of the literature. *Psychooncology*. 2010; 19(12):1250–1258. [PubMed: 20213857]
9. Kuo CJ, Chen VC, Lee WC, et al. Asthma and suicide mortality in young people: a 12-year follow-up study. *Am J Psychiatry*. 2010; 167(9):1092–1099. [PubMed: 20634368]

10. Ilgen MA, Kleinberg F, Ignacio RV, et al. Noncancer Pain Conditions and Risk of Suicide. *JAMA Psychiatry*. 2013;1–6. [PubMed: 23925710]
11. Ahmedani BK, Peterson EL, Hu Y, Rossom RC, et al. Major Physical Health Conditions and Risk of Suicide. *Am J Prev Med*. 2017 Jun 7.
12. Dalgard FJ, Gieler U, Tomas-Aragones L, et al. The psychological burden of skin diseases: a cross-sectional multicenter study among dermatological out-patients in 13 European countries. *J Invest Dermatol*. 2015; 135(4):984–991. [PubMed: 25521458]
13. Picardi A, Mazzotti E, Pasquini P. Prevalence and correlates of suicidal ideation among patients with skin disease. *J Am Acad Dermatol*. 2006 Mar; 54(3):420–6. [PubMed: 16488292]
14. Schrom K, Nagy T, Mostow E. Depression screening using health questionnaires in patients receiving oral isotretinoin for acne vulgaris. *J Am Acad Dermatol*. 2016 Jul; 75(1):237–9. [PubMed: 27317530]
15. Picardi A, Lega I, Tarolla E. Suicide risk in skin disorders. *Clin Dermatol*. 2013 Jan-Feb;31(1):47–56. [PubMed: 23245973]
16. Pompili M, Innamorati M, Forte A, Erbuto D, Lamis DA, Narcisi A, Rea C, Orsini D, D'Arino A, Arcese A, Bellini S, Trovarelli S, Serafini G, Amore M, Costanzo A, Girardi P. Psychiatric comorbidity and suicidal ideation in psoriasis, melanoma and allergic disorders. *Int J Psychiatry Clin Pract*. 2017 Mar 22.:1–6.
17. Danesh MJ, Kimball AB. Brodalumab and suicidal ideation in the context of a recent economic crisis in the United States. *J Am Acad Dermatol*. 2016 Jan; 74(1):190–2. [PubMed: 26702804]
18. Gupta MA, Pur DR, Vujcic B, Gupta AK. Suicidal behaviors in the dermatology patient. *Clin Dermatol*. 2017 May-Jun;35(3):302–311. [PubMed: 28511829]
19. Hornbrook MC, Hart G, Ellis JL, et al. Building a virtual cancer research organization. *J Natl Cancer Inst Monogr*. 2005; (35):12–25.
20. Go AS, Magid DJ, Wells B, et al. The Cardiovascular Research Network: a new paradigm for cardiovascular quality and outcomes research. *Circ Cardiovasc Qual Outcomes*. 2008; 1(2):138–147. [PubMed: 20031802]
21. Ahmedani BK, Stewart C, Simon GE, et al. Racial/Ethnic differences in health care visits made before suicide attempt across the United States. *Med Care*. 2015; 53(5):430–435. [PubMed: 25872151]

Table

Diagnosis	Control		Case % (n)	OR(95% CI)	p-value	aOR* (95% CI)	p-value	aOR** (95% CI)	p-value
	% (n)	% (n)							
Diagnosis									
Psoriasis	0.77 (2062)	0.97 (26)	0.97 (26)	1.26(0.86, 1.86)	0.237	1.06(0.72, 1.57)	0.755	0.91(0.61, 1.35)	0.643
Malignant melanoma	0.13 (336)	0.22 (6)	0.22 (6)	1.79(0.80, 4.01)	0.159	1.20(0.53, 2.72)	0.654	1.06(0.46, 2.42)	0.888
Other malignant neoplasm	0.90 (2403)	1.91 (51)	1.91 (51)	2.15(1.62, 2.84)	0.001	1.22(0.92,1.63)	0.164	1.15(0.87, 1.54)	0.331
Benign neoplasm	3.09 (8274)	1.80 (48)	1.80 (48)	0.57(0.43, 0.76)	0.001	0.57(0.43, 0.76)	0.001	0.53(0.40, 0.71)	0.001
Atopic dermatitis	1.13 (3018)	0.67 (18)	0.67 (18)	0.59(0.37, 0.95)	0.028	0.84(0.52, 1.33)	0.448	0.77(0.48, 1.24)	0.28
Contact dermatitis	4.76 (12719)	4.97 (133)	4.97 (133)	1.05(0.88, 1.25)	0.592	1.02(0.85, 1.22)	0.838	0.90(0.75, 1.08)	0.251
Erythematous conditions	1.06 (2831)	1.12 (30)	1.12 (30)	1.06(0.74, 1.53)	0.744	1.03(0.72, 1.48)	0.872	0.90(0.62, 1.30)	0.571
Pruritus	0.85 (2277)	1.20 (32)	1.20 (32)	1.41(1.00, 2.01)	0.053	1.35(0.95, 1.92)	0.098	1.09(0.76, 1.56)	0.633
Other skin disease	13.83 (36980)	17.61 (471)	17.61 (471)	1.33(1.26, 1.47)	0.001	1.12(1.01, 1.24)	0.028	0.98(0.88, 1.08)	0.661
Acne	2.25 (6014)	1.72 (46)	1.72 (46)	0.76(0.57, 1.02)	0.068	1.21(0.90, 1.63)	0.2	1.04(0.77, 1.40)	0.814
Alopecia	0.41 (1100)	0.52 (14)	0.52 (14)	1.28(0.75, 2.16)	0.368	1.69(0.99, 2.87)	0.053	1.39(0.82, 2.38)	0.226
Any of above	20.33 (54364)	23.15 (619)	23.15 (619)	1.18(1.08, 1.29)	0.001	1.07(0.97, 1.17)	0.165	0.92(0.84, 1.01)	0.096

* Adjusted for age and sex

** Adjusted for age, sex and mental health of substance use conditions