

## Month of Birth, a Risk Factor for Violent Behaviour in Suicidal Patients Admitted in Emergency?

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**Abstract** Although there are numerous publications on the existing link between month of birth and suicide, only two studies focus on suicide attempts and auto-aggressive behavior. Research data suggest that month of birth is related to a variation of 5-HIAA in the cerebrospinal fluid, which correlates with violent behavior (VB). Therefore, the aim of this study is to search, for the first time, for a possible link between month of birth and the occurrence of VB in emergency, for patients admitted for a suicide attempt with medication. This is a 10 months prospective study among all the patients of the canton of Geneva, Switzerland, admitted in emergency for a suicide attempt with medication. During a 10 months study period we included 493 patients, of which 77 (15.62%) presented VB. Higher incidence of VB was found in subjects where born at the end of winter and the beginning of spring, with a maximum for April and a minimum for December. In spite of a relatively small number of subjects, it seems promising to study the occurrence of VB as a function of month of birth in patients admitted in emergency for a suicide attempt.

**Keywords** Month of birth · Suicide attempt with medication · Violent behavior · Emergency

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## Introduction

Certain pseudo-sciences of “astrologic inspiration” seemed to have monopolized the debate over the impact of date and place of birth on the individual development, throughout the intensive use of horoscope. Nevertheless, as early as 1938, medical doctors were already attracted by this subject [1]. Recently, several papers suggests that month of birth seems to be a risk factor for several diseases such as epilepsy [2], breast [3], and testicular [4] cancer, Crohn disease [5], certain cardio-vascular diseases [6], and even for lymphoblastic leukemia in childrens [7]. This epidemiologic data were assumed to be in relationship with potential environmental risk factors: intra-uterine, perinatal, and postnatal factors, such viral infections [8].

Several psychiatric studies mentioned a higher frequency of winter and spring birth date for patients with schizophrenia and of spring and summer birth date for patients with affective disorders [9, 10]. However, this data has not always been confirmed [11].

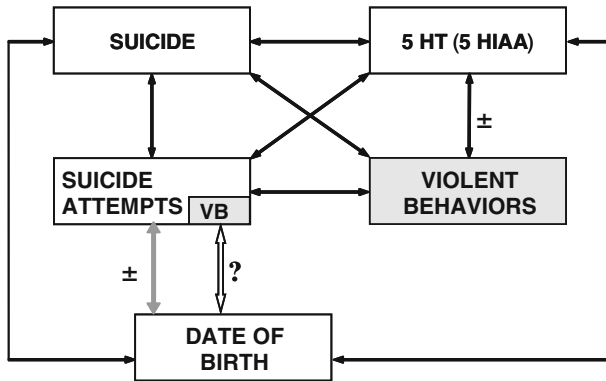
While Doblhammer and Vaupel [12] suggests the existence of a relation between the month of birth and longevity, Salib and Cortina-Borja [13] searched a link with suicide. In spite of several geographical differences, it seems that people born in spring have a higher risk of suicide [13, 14]. Some hypotheses have been advanced in order to explain the link between suicide and month of birth. A neuro-developmental hypothesis involves the sensitivity of the central nervous system of the uterine environment towards certain variations related to seasonal changes: maternal infections, diet, photoperiod, temperature. A neuro-biochemical hypothesis, involving the serotonergic system is based on a lower level of the serotonergic metabolite 5-HIAA in the cerebrospinal fluid of the patients with suicidal behavior [15] and on a lower level of 5-HIAA occurring in people born in spring [16].

In spite of the abundant research on the month of birth as a risk factor for suicide [9, 13], we found only two papers about month of birth and suicide attempts (SA) or self-mutilation [17–19]. While many data show a relation between suicide attempts, suicide, and serotonergic pathways [20], studies of psychological autopsy of suicide suggest that violent suicide methods are associated with more aggressive and violent behavior (VB) during life [21]. Moreover, VB seems to be related to the 5-HIAA levels which vary also with the date of birth [16].

Integrating these literature data, it appears interesting to study for the first time the relationship existing between the month of birth of suicidal patients with or without violent behavior (Fig. 1). The identification of a stronger link with the date of birth for the subgroup of patients with VB and suicide attempt than for the patients without VB, might suggest the existence of a neurobiological feature, possibly related to the serotonergic pathways.

## Method

This study was conducted on patients admitted at the only center for psychiatric emergencies in the canton of Geneva (450,000 inhabitants), Switzerland, admitted for a suicide attempt by medication, during a 10 months period. The comprehensive screening of all suicide attempts, socio-demographic data and the presence of VB were gathered prospectively for a randomized study searching the efficacy of a specific crisis intervention in emergency. Data were anonymized and treated by an independent investigator, accordingly to the ethical norms present in Geneva.



**Fig. 1** Literature review and Study hypothesis. An extensive Medline review (1965–2007) illustrate that in spite of the abundant data concerning links between the month of birth, suicide, serotonin (and 5-HIAA), there are only two papers about the month of birth and suicide attempts ( $\pm$ ). Moreover, many data show links between suicide attempts, suicide, violent behaviors, and serotonin (5-HIAA). Integrating those data to some studies suggesting ( $\pm$ ) a link between violent behavior and 5-HIAA, it seems interesting to study for the first time the relationship (?) between the patients with suicidal attempts and violent behavior and their date of birth. The identification of a stronger link with the date of birth for the subgroup of patients with violent behaviors and suicide attempt, might suggest the existence of a specific neurobiological feature, possibly related to the serotonergic pathways

During the screening period of 10 months 493 patients (10.3%) committed suicide attempts by volunteer drug intoxication requiring a somatic surveillance.

The presence of VB was assessed by means of a questionnaire which describes the nature and the circumstances of the violent acts [22].

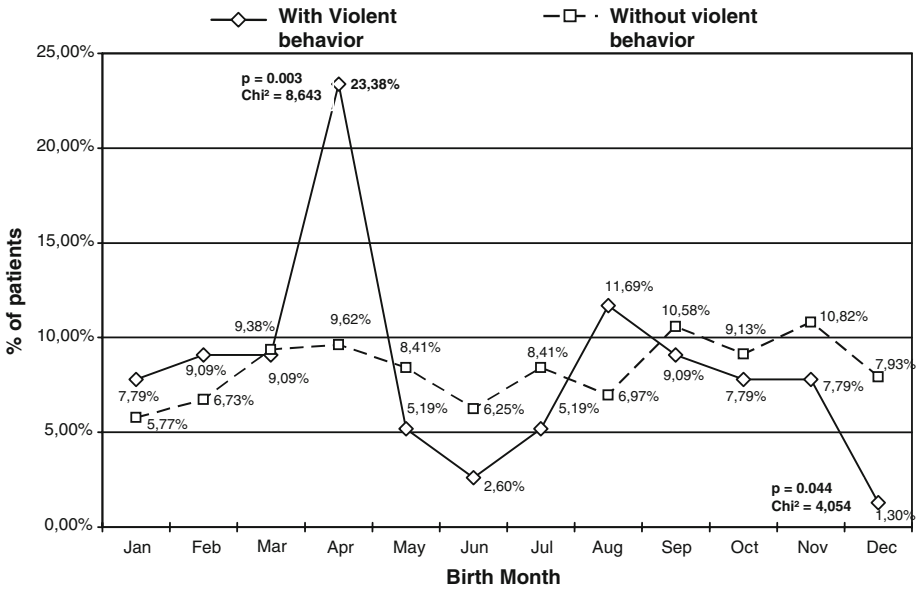
Data were analyzed with the SPSS 12.01 program and the *t* square test with 2\*2 tables were used to compare each birth month with the others and also with the annual average. The *t*-student test was used to study the gender differences.

## Results

VB was found in 77 subjects (15.62%) from 493 patients admitted for suicidal attempt. Patients born in April had more VB (31.03%) in comparison with those born in May (10.26%;  $\chi^2 = 5.74$ ;  $P = 0.017$ ), June (7.14%;  $\chi^2 = 6.04$ ;  $P = 0.014$ ), July (10.26%;  $\chi^2 = 5.74$ ;  $P = 0.017$ ), September (13.73%;  $\chi^2 = 4.60$ ;  $P = 0.032$ ), October (13.64%;  $\chi^2 = 4.21$ ;  $P = 0.040$ ), November (11.76%;  $\chi^2 = 5.87$ ;  $P = 0.015$ ) and December (2.94%;  $\chi^2 = 10.32$ ;  $P = 0.001$ ). Moreover, patients born in December had less VB than those born in January (20.00%;  $\chi^2 = 4.76$ ;  $P = 0.029$ ), February (20.00%;  $\chi^2 = 4.90$ ;  $P = 0.027$ ), Mars (15.22%;  $\chi^2 = 3.27$ ;  $P = 0.007$ ), April (31.03%;  $\chi^2 = 10.32$ ;  $P = 0.001$ ) and August (23.68%;  $\chi^2 = 6.45$ ;  $P = 0.011$ ). In comparison with the total number of VB divided by the total number of subjects, patients born in April have a higher number of VB, while those born in December present less VB (Fig. 2).

Even if no significant difference was found among the four seasons, patients born in January, February, March, and April had more VB (22.49%) compared to those born in September, October, November, and December (11.11%),  $\chi^2 = 8.14$ ;  $P = 0.004$ .

No significant difference was found between men and women considering the possible influence of their month of birth for the violent behavior.



**Fig. 2** Month of birth of patients with and without violent behaviour, admitted in emergency after a suicide attempt

**Discussion**

The interest of this study reside is the lack of balance in the literature between many papers studying the relation month of birth and suicide [9, 13], compared to only three studies about month of birth and suicide attempt or self-mutilative behavior [17–19]. Moreover, this is the first study which suggests a bigger influence of month of birth as a risk factor in suicidal patients with violent behaviour. Thus, taking into account the presence of a violent behaviour in patients with suicidal attempts could be an interesting way for future studies about the influence of the birth month.

Those data are in accordance with a higher frequency of suicide attempts for patients born in spring [17, 18], but also with data suggesting more dead following a suicide attempt for people born in spring [13, 14]. Interestingly, these results seems also in accord with lower values of 5-HIAA found in cerebrospinal fluid of patients born in spring [16, 23]. Nevertheless, our data are not concordant with a study which found that adolescents born during autumn had more chance to have a self-mutilative behavior [19]. Beside of methodological limitation of this study (small sample), those differences could be related to the differences of seasons (lightening, nutritional factors, etc.) between Finland and Switzerland, but also to the differences between violent behavior in adults versus self-mutilative behavior in adolescents.

**Conclusion**

In spite of a small number of subjects (493), this study suggests that VB could be an interesting factor for the study of the relation between suicidal behavior and the birth

month. Further studies should search the existence of a subgroup of patients born in spring having a higher risk of VB and some specific serotonergic patterns (lower 5-HIAA in the cerebrospinal fluid).

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## References

1. Huntington E: Season of birth: Its relation to human abilities. New York, Wiley, 1938
2. Torrey EF, Miller J, Rawlings R, et al.: Seasonal birth patterns of neurological disorders. *Neuroepidemiology* 19:177–185, 2000. doi:[10.1159/000026253](https://doi.org/10.1159/000026253)
3. Kristoffersen S, Hartveit F: Is a woman's date of birth related to her risk of developing breast cancer? *Oncology Reports* 7:245–247, 2000
4. Prener A, Carstensen B: Month of birth and testicular cancer risk in Denmark. *American Journal of Epidemiology* 131:15–19, 1990
5. Sorensen HT, Pedersen L, Norgard B, et al.: Does month of birth affect risk of Crohn's disease in childhood and adolescence? *BMJ* 323:907, 2001. doi:[10.1136/bmj.323.7318.907](https://doi.org/10.1136/bmj.323.7318.907)
6. Lawlor DA, Davey Smith G, Mitchell R, et al.: Temperature at birth, coronary heart disease, and insulin resistance: Cross sectional analyses of the British women's heart and health study. *Heart* 90:381–388, 2004. doi:[10.1136/hrt.2002.009548](https://doi.org/10.1136/hrt.2002.009548)
7. Sorensen HT, Pedersen L, Olsen J, et al.: Seasonal variation in month of birth and diagnosis of early childhood acute lymphoblastic leukemia. *JAMA* 285:168–169, 2001. doi:[10.1001/jama.285.2.168](https://doi.org/10.1001/jama.285.2.168)
8. Fossey E, Shapiro CM: Seasonality in psychiatry a review. *Canadian Journal of Psychiatry* 37:299–308, 1992.
9. Castrogiovanni P, Iapichino S, Pacchierotti C, et al.: Season of birth in psychiatry. A review. *Neuropsychobiology* 37:175–181, 1998. doi:[10.1159/000026499](https://doi.org/10.1159/000026499)
10. Pjrek E, Winkler D, Heiden A, et al.: Seasonality of birth in seasonal affective disorder. *The Journal of Clinical Psychiatry* 65:1389–1393, 2004
11. Newman SC, Bland RC: Month of birth and schizophrenia in Alberta. *Canadian Journal of Psychiatry* 33:705–706, 1988
12. Doblhammer G, Vaupel JW: Lifespan depends on month of birth. *Proceedings of the National Academy of Sciences of the United States of America* 98:2934–2939, 2001. doi:[10.1073/pnas.041431898](https://doi.org/10.1073/pnas.041431898)
13. Salib E, Cortina-Borja M: Effect of month of birth on the risk of suicide. *The British Journal of Psychiatry* 188:416–422, 2006. doi:[10.1192/bjp.bp.105.009118](https://doi.org/10.1192/bjp.bp.105.009118)
14. Joiner TE, Pfaff JJ, Acres JG, et al.: Birth month and suicidal and depressive symptoms in Australians born in the Southern vs. the Northern hemisphere. *Psychiatry Research* 112:89–92, 2002. doi:[10.1016/S0165-1781\(02\)00183-X](https://doi.org/10.1016/S0165-1781(02)00183-X)
15. Nordstrom P, Samuelsson M, Asberg M, et al.: CSF 5-HIAA predicts suicide risk after attempted suicide. *Suicide & Life-Threatening Behavior* 24:1–9, 1994
16. Chotai J, Adolfsson R: Converging evidence suggests that monoamine neurotransmitter turnover in human adults is associated with their season of birth. *European Archives of Psychiatry and Clinical Neuroscience* 252:130–134, 2002. doi:[10.1007/s00406-002-0372-7](https://doi.org/10.1007/s00406-002-0372-7)
17. Beck AT, Lester D: Attempted suicide and month of birth. *Psychological Reports* 33:506, 1973
18. Rock D, Greenberg D, Hallmayer J: Season-of-birth as a risk factor for the seasonality of suicidal behaviour. *European Archives of Psychiatry and Clinical Neuroscience* 256:98–105, 2006. doi:[10.1007/s00406-005-0614-6](https://doi.org/10.1007/s00406-005-0614-6)
19. Riala K, Hakko H, Räsänen P: Birth during autumn is a risk for adolescent self-mutilative behavior. *Neuropsychobiology* 56:14–18, 2007. doi:[10.1159/000109972](https://doi.org/10.1159/000109972)
20. Bondy B, Buettner A, Zill P: Genetics of suicide. *Molecular Psychiatry* 11:336–351, 2006. doi:[10.1038/sj.mp.4001803](https://doi.org/10.1038/sj.mp.4001803)
21. Dumais A, Lesage AD, Lalovic A, et al.: Is violent method of suicide a behavioral marker of lifetime aggression? *The American Journal of Psychiatry* 162:1375–1378, 2005. doi:[10.1176/appi.ajp.162.7.1375](https://doi.org/10.1176/appi.ajp.162.7.1375)
22. Cailhol L, Allen M, Moncany AH, Cicotti A, Virgillito S, Barbe RP, Lazignac C, Damsa C: Violent behavior of patients admitted in emergency following drug suicidal attempt: A specific staff educational crisis intervention. *General Hospital Psychiatry* 29:42–44, 2007. doi:[10.1016/j.genhosppsy.2006.10.007](https://doi.org/10.1016/j.genhosppsy.2006.10.007)

23. Roggenbach J, Muller-Oerlinghausen B, Franke L: Suicidality, impulsivity and aggression—is there a link to 5HIAA concentration in the cerebrospinal fluid? *Psychiatry Research* 113:193–206, 2002. doi: [10.1016/S0165-1781\(02\)00230-5](https://doi.org/10.1016/S0165-1781(02)00230-5)

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