Novel methods to Identify Suicide Ideation and Suicidal Attempts in a Psychiatric Clinical Research Database using Natural Language Processing

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**Supplementary Material**

This document contains definition of suicide attempt and suicide ideation, inter-rater agreement, list of terms used to retrieve documents containing variations of the term “suicide attempt” and list of phrases excluded during post-processing of suicide attempt classifier.

Coding Suicidal Ideation/Thoughts

Rules to guide systematic coding of Suicide Ideation and Attempts Mentions in clinical text to create Gold Standard and Training sets.

Suicidal Ideation definition from Beck’s Suicidal Ideation scale:

“Suicide ideation is represented by the presence of current plans and wishes to commit suicide in individuals who have not made any recent overt suicide attempts” [ref Beck et al. (1972)

Code

* Having ever experienced ideation – code as positive
* Having never experienced suicidal ideation – code as negative
* Having had experienced ideation or Irrelevant mention of ideation – code as unknown

Negative and Unknown to be merged as Negative

Terms used to identify suicide ideation:

Suicid\* Ideat\*

Coding Rules

Code text as Positive if text indicates

* Suicidal ideation or thoughts
* Presence of current plans
* Passive suicidal ideation
* No wish to live /Wishes to commit suicide / to be dead
* Feeling suicidal (ref Olfson et al, 1996)
* Strong desire to attempt suicide
* Continuous, chronic or almost continuous thoughts
* Well planned thoughts exists / has ideas and plans of how to do act
* Evidence of complete / half-complete suicide note exists (Beck’s Suicidal ideation scale, 1979)

Code text as Negative if text indicates

* no evidence of suicidal ideation or suicidality
* denies suicidal ideation, plan or desires or suicidality
* fleeting thoughts (ref Beck’s Suicidal ideation scale, 1979 and Columbia Suicide Severity Scale, 2003 – the section on Intensity of Ideation)
* the record is irrelevant
* context is incomprehensible or contradictory or complex to decide
* suicide attempt
* a third person (other than clinical staff) thinks the patient is suicidal
* no *further* evidence of suicidal thoughts
* there is a generic high/low risk of patient committing suicide /self-harm behaviour.

References

[1] A. T. Beck, M. Kovacs, and A. Weissman, “Assessment of suicidal intention: the Scale for Suicide Ideation.,” *J. Consult. Clin. Psychol.*, vol. 47, no. 2, pp. 343–352, 1979.

[2] M. Olfson, M. M. Weissman, A. C. Leon, D. V Sheehan, and L. Farber, “Suicidal ideation in primary care,” *J. Gen. Intern. Med.*, vol. 11, no. 8, pp. 447–453, 1996.

[3] John Mann, M. Oquendo, and K. Posner, “Columbia-Suicide Severity Rating Scale (C-Ssrs),” *Clin. Pract.*, pp. 103–130, 2003.

Coding Suicide Attempts

Suicide Attempt definition from Centre for Disease Control:

“A non-fatal, self-directed, potentially injurious behaviour with an intent to die as a result of the behaviour; might not result in injury”

(<http://www.cdc.gov/violenceprevention/suicide/definitions.html)>

Important note before coding: Any mention where the patient has undergone/experience intentional harm to self (physically via action directed at self) should be counted as suicide attempt. Literal mentions of “self-harm” are ignored because of danger of over-including DSH events which are different to a suicide attempt

Code

* Having ever experienced suicide attempt – code as positive
* Having never experienced suicidal attempt – code as negative
* Having had experienced attempt or Irrelevant mention of attempt – code as unknown

Negative and Unknown to be merged as Negative

Terms used to identify suicide attempt:

See Appendix C

Coding Rules

Code text as Positive if text indicates

* it meets the description of a Suicide attempt (See above for Suicide Attempt definition)

Code text as Negative if

* patient or clinical staff are denying or negating the suicide attempt (e.g. she never attempted suicide)
* patient or clinical staff are referring to family member who attempted suicide (e.g. mum attempted suicide)
* mention of suicide attempt is irrelevant (e.g. in theory suicide attempts are harsh)
* mention of suicide attempt is confusing or uncomprehensive
* mention of suicide attempt / a literal mention of “self-harm”

Supplementary TABLE S1: Inter-rater agreement evaluation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Agreed Instances | Disagreed Instances | Total Annotated | Observed Agreement (%) | Cohen's Kappa |
| Ideation | 117 | 9 | 126 | 92.9 | 0.85 |
| Attempts | 123 | 3 | 126 | 97.6 | 0.86 |

Supplementary Table S2: List of terms and phrases used to identify suicide attempt mentions.

|  |
| --- |
| after a suicide attempt |
| another attempt to end [0,1] life |
| another sucid[e/al] attempt |
| attempt at self-harm |
| attempt on [his/her] life |
| attempt to commit suicide |
| attempt to suicide |
| attempt[ed] suicide |
| attempt[ed] to commit suicide |
| attempt[ed] to end [his/her] life |
| attempt[s] [1, 4] suicide |
| attempted to kill [him/her] self |
| attempted to take [his/her] life |
| depression with suicide attempt |
| failed suicid[e/al] attempt |
| first attempt at [his/her] life |
| following [his/her] suicid[e/al] attempt |
| following a suicide attempt |
| [he/she] jumped off a bridge |
| his suicide attempt was not successful |
| history of suicide attempt[s] |
| in an attempt to kill [him/her] self |
| leapt in front of motor |
| leapt in front of moving |
| leapt in front of traffic |
| leapt in front of vehicles |
| next time [he/she] attempts suicide |
| [number] suicid[e/al] attempt[s] |
| previous [0,1] attempt by |
| previous [0,1] attempt to |
| previous [0,1] attempt to take [0,1] life |
| shot [him/her]self |
| suicid[e/al] [0,3] attempt[s] |
| suicid[e/al] attempt due to depression |
| suicid[e/al] attempt was not successful |
| suicid[e/al] attempt[s] |
| suicid[e/al] behaviour |
| suicid[e/al] gesture |
| suicide attempt age [Number] |
| suicide attempt failed |
| took firearm to self |
| took gun to self |
| took handgun to self |
| took knife to self |
| took rifle to self |
| tried to drown [him/her]self |
| tried to end [his/her] life |
| tried to hang [him/her]self |
| tried to kill [him / her] self |
| tried to shoot [him/her] self |
| tried to take [his/her]life |
| walked in front of motor |
| walked in front of moving |
| walked in front of traffic |
| walked in front of vehicles |