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Commentary

Rethinking suicidality as an outcome: conceptual and methodological considerations from the SPIRIT trial

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Response

It was with great interest that I read the results of the SPIRIT trial, which tested a multifaceted intervention for suicide prevention in the state of Gujarat, India.[1] The authors are to be commended for the extensive work involved in conducting this large and complex trial; however, several methodological and interpretative aspects warrant further discussion.

First, the conclusion that the intervention 'reduced suicide deaths' may overstate the evidence. The number of suicide deaths in the intervention arm remained unchanged between the pre- and post-intervention periods (44 deaths in each), as previously highlighted by Eddleston and Weerasinghe[2] in a recent commentary in this journal. Although the point estimate suggested a lower post-intervention suicide incidence rate relative to the control arm (30.7 *v.* 43.7 per 100 000 person-years), the result did not reach statistical significance (IRR 0.57, 95% CI 0.32–1.02). Taken together, these findings indicate no reduction in observed suicide deaths but rather a non-significant relative decrease in the incidence rate driven by an increase in deaths in the control arm. Importantly, the analysis of suicide mortality may have lacked adequate statistical power, as the trial's sample size was calculated on the basis of a composite outcome rather than suicide deaths specifically – an approach commonly used for rare events. Although the authors acknowledge that the study was underpowered for suicide mortality, this limitation makes it difficult to distinguish between a true but undetected effect (type II error) and stochastic variation. Consequently, the observed trend should be interpreted cautiously and does not provide sufficiently robust evidence to conclude that the intervention reduces suicide mortality.

At a more conceptual level, the choice of the primary outcome[1,3] itself warrants careful reconsideration. The use of a composite endpoint combining suicide attempts and deaths assumes that these events reflect a single underlying construct of 'suicidality'. While composite outcomes may improve statistical efficiency and feasibility, their interpretability depends on whether the individual components reflect a sufficiently coherent clinical construct and are likely to be influenced by the intervention in a similar direction and magnitude. When this assumption does not hold, as may be the case here, gains in power may come at the expense of construct validity and clinical interpretability, and no degree of statistical power can resolve uncertainty regarding whether the selected outcome validly captures the phenomenon of interest.[4]

In the context of suicidal behaviour, suicide attempts and suicide deaths differ markedly in frequency, case fatality, temporal dynamics and underlying mechanisms.[5] Although related, these outcomes may respond differently to intervention because preventive strategies often act on distinct stages of the suicidal process. Prior suicide attempts strongly predict long-term suicide risk, yet their ability to predict imminent risk is more limited, suggesting that chronic vulnerability and acute transition to suicide may be only partially overlapping processes.[6] Some suicide deaths may occur on a first attempt, without prior ideation, planning or previous non-fatal behaviour coming to clinical attention, thereby offering fewer opportunities for intervention. Acute high-lethality suicidal acts may also be more strongly influenced by access to means, impulsivity or sex-related differences. Conversely, an intervention may reduce the lethality of suicidal behaviour and thereby increase survival after attempts without reducing the overall number of attempts.[6–9] Thus, different preventive strategies may influence distinct outcomes within the spectrum of suicidal behaviour. Interventions targeting emotional distress, coping skills or help-seeking may primarily affect suicidal ideation, whereas means restriction interventions may exert their greatest effect on suicide mortality by reducing the lethality of suicidal acts, with interventions focused on crisis management or access to care potentially influencing suicide attempts. Such differential effects call into question the assumption that ideation, attempts and suicide deaths constitute interchangeable manifestations of a single construct.

These considerations are particularly relevant in the context of the SPIRIT intervention, which was explicitly multifaceted, targeting upstream determinants of suicidal behaviour through school-based mental health promotion, community-level detection and management of risk through the training of health workers and proximal lethality through the provision of pesticide storage facilities. While this breadth represents a strength, it also complicates reliance on a single composite endpoint. Different components would be expected to act on distinct temporal stages of the suicidal process and may therefore exert divergent effects on suicide attempts and deaths. In particular, the means restriction component is most directly linked to reducing the lethality of suicidal acts rather than changing suicidal ideation or behavioural propensity. From this perspective, suicide mortality represents the outcome most closely aligned with the most proximal causal pathway of the intervention. Including non-fatal attempts in the primary endpoint therefore introduces events that the intervention is not necessarily expected to influence in the same direction, complicating interpretation of the overall effect. Indeed, the pattern of findings observed in the trial is consistent with the possibility that altering access to lethal means could reduce the risk of death by suicide without reducing the risk of non-fatal suicidal behaviour.

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This potential divergence highlights the non-linear relationship between suicide attempts and suicide deaths and challenges the assumption that these outcomes lie on a single continuum. Rather, transitions from suicidal thoughts to attempts and from attempts to death may be governed by partly distinct and time-dependent mechanisms.

In this context, the rationale for the composite endpoint seems to rest more on considerations of feasibility and statistical efficiency than on a coherent model of suicidal behaviour. Although this approach may be methodologically pragmatic, it leaves the trial under-powered for suicide mortality, arguably its most clinically important component. Pre-specified analyses of individual components or alternative approaches such as hierarchical, competing-risk or multi-state models may therefore provide a more informative assessment of intervention effects.

To conclude, this trial provides a valuable opportunity to reflect on the conceptual and methodological challenges inherent in studying suicidality, an outcome that remains both highly consequential and intrinsically difficult to define and measure. The SPIRIT study therefore contributes meaningfully to the ongoing discussion of how suicidality should be conceptualised and assessed in suicide prevention trials.

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Declaration of interest

None.

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