Correspondence: food insecurity and the risk of suicidal thoughts and behaviours

Letter to the Editors of the *Journal of Affective Disorders*

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Dear Editors,

We are a team of researchers interested in the mental health impacts of food insecurity. We are writing to identify an anomaly in the recent systematic review and meta-analysis published in the *Journal of Affective Disorders* by Kaggwa et al. 2023, of which one of us is the lead author, entitled "The global burden of suicidal behavior among people experiencing food insecurity: A systematic review and meta-analysis". The review reports the unexpected finding that suicide attempts are *less* common in people who report being food insecure. This is particularly striking given that many studies within the review report the opposite; that people experiencing food insecurity are *more* likely to attempt suicide with this finding also reported in further studies since the review's searches were conducted (Smith et al., 2022; Steare et al., 2024).

The anomaly we have identified relates to one of the studies included in the meta-analysis, which appears to have heavily skewed the pooled estimates. There are significant issues with the included study that have come to our attention following recent correspondence between the authors of this letter.

We note that the pooled odds ratios for suicidal ideation, planning, and attempts within the review are heavily influenced by one multi-country study that analysed the association between food insecurity and suicidal ideation, plans, and attempts across six countries participating in the Global School-based Student Health Survey. The study reported odds ratios comparing the odds of each outcome in food secure adolescents compared to food insecure adolescents. In five of the six countries food secure adolescents were less likely than food insecure controls to experience suicidal ideation or to attempt suicide but were more likely to have made a plan for attempting suicide. We have identified significant methodological issues with the study, and also in the interpretation of the study's findings in the meta-analysis by Kaggwa and colleagues.

The first major concern we have about the multi-country study is that the author reports the association between food insecurity and suicide attempts in six countries, however the datasets for these countries do not include a variable assessing suicide attempts (as evidenced from inspecting the publicly available datasets, questionnaires, and data dictionaries; we have also confirmed this is the case from communication with the study funders: the World Health Organization). Therefore, these results for suicide attempt would appear to be false, with the implications that the

multi-country study should not be included in the meta-analysis by Kaggwa and colleagues (which requires revision).

Our second major concern about the multi-country study was that after replicating the analyses ourselves (https://github.com/tomsteare/GSHS/blob/main/GSHS%20reanalyses.do), we were able to obtain a very close match between their effect estimates reported for suicide attempts and our effect estimates for the suicide plans variable. This suggests that in the models they purport to relate to suicide attempts relate to the suicide plans variable instead. We were unable to find any match between our estimates for any outcome in the dataset and their estimates for suicide plans. We therefore suggest that the results reported for the association of suicide plan with food insecurity are incorrect and refer to results for a different variable that we have not been able to identify in the dataset, whilst the results they report for suicide attempt actually refer to suicide plans instead.

Our third major concern about the multi-country study is that it reports implausibly narrow confidence intervals and therefore implausibly small standard errors for each effect estimate across the different country samples. When calculating a pooled effect estimate within any meta-analysis, studies with a small standard error receive a higher weighting and therefore have greater influence on the pooled effect. As an example, for the Kenya sample (n=3,691) in the multi-country study an odds ratio for suicide attempt of 0.58 is reported (which, as per the point above, was in reality for the outcome of suicide plans). The odds ratio has an extremely narrow confidence interval (95% CI: 0.57 to 0.59), and therefore an extremely small standard error (SE = (upper bound – lower bound)/(2*1.96) = (0.59 – 0.57)/3.92 = 0.0051)). Due to the extremely small standard error, this effect estimate is heavily weighted (77.8%) in the meta-analysis and therefore the pooled effect estimate for suicide attempts is primarily estimated from this study and dominates over the rest of the studies within the review, which consistently report findings in the opposite direction. Aiming to replicate the analysis using the open access data from the Global School-based Student Health Survey in Kenya, we calculated a much larger standard error (over 16 times larger) for this effect estimate (OR = 0.58, 95% CI: 0.44 to 0.77, SE = 0.083).

Given the above methodological problems in the mult-country study we have, by extension concerns about the inaccuracies this has introduced into the recent meta-analysis by Kaggwa et al. The effect estimates from the multi-country study comprise 9%, 98% and 92% of the total study

weighting for the meta-analyses of suicide ideation, planning, and attempts respectively, given their small standard errors. In the case of suicide planning and attempts, almost all the contribution to the pooled effect estimate therefore derives from the odds ratios reported by the study, which as highlighted do not refer to these specific variables, and therefore the results of the meta-analyses in Kaggwa et al., (2023) mostly disregard the effect estimates from all other studies.

Furthermore, as the standard error of the pooled effect estimate for each outcome in the meta-analysis is calculated according to the standard error of each included effect estimate, the standard error of the pooled estimates is also impacted by the implausible standard error values reported in the multi-country study. As an example, the 95% confidence interval for the pooled effect in the meta-analysis of suicide attempt ranges from 0.617 to 0.627, and therefore the pooled effect has an extremely small standard error (0.0026) for a meta-analysis of 12 effect estimates (six of which are from the multi-country study).

Finally, in the meta-analyses carried out by Kaggwa and colleagues, the odds ratios reported reflect the odds of each outcome in people reporting food insecurity compared to those who are food secure, however the review authors did not transform the odds ratios from the multi-country study prior to including them in the meta-analyses. Accordingly, the effect estimates derived from the multi-country study are invalid and bias the meta-analysis findings. As an example, the odds ratio for suicidal ideation in the Botswana sample reported within the multi-country study (OR = 0.59) shows that food secure adolescents are *less* likely to report suicidal ideation. However, when added as effect estimates to the meta-analysis the direction of the effect estimates is incorrectly interpreted: that food secure adolescents are *more* likely to experience suicidal ideation.

In summary, the clear errors in at least one study included in the Kaggwa et al meta-analysis, plus further misinterpretation of this study's findings by the meta-analysis authors has had substantial consequences for the reported findings of the meta-analysis. It is highly likely that the findings from the meta-analysis are incorrect and therefore misleading to policymakers, clinicians, and the general public, in ways that may threaten public health. We propose that the reported finding that suicide attempts are *less* common in people experiencing food insecurity is explained both by errors in at least one included study as well as errors made by the review team in interpreting the results of this study. We are concerned that these published findings are misleading and given the extent of the erroneous conclusions and the high policy relevance of the research question, the

Kaggwa et al systematic review and meta-analysis requires reanalysis and substantial edits. We are also communicating with the editorial board of the journal where the multi-country study is published to outline our concerns regarding the multi-country study.

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Declaration of interest

MK is the corresponding author of the article “The global burden of suicidal behavior among people experiencing food insecurity: A systematic review and meta-analysis” published in the Journal of Affective Disorders 342 (2023).