RESPONSE

Response to the Letter by Natamba et al.

To the Editor,

Thank you very much for sharing with us the Letter to the Editor written in response to our paper, "The association between food insecurity and depressive symptoms severity among pregnant women differs by social support category: a cross-sectional study" (Natamba et al., 2016). Before responding to specific comments raised by the authors of this letter, we would like to present here a brief summary regarding the rationale for our study, the methods we used and highlight important observations that were made.

The primary goal of our study was to determine whether the strength of the association between food insecurity (measured with the individually-focused food insecurity scale; IFIAS [Natamba et al., 2014]) and depressive symptoms severity (Center for Epidemiologic Studies-Depression: CES-D [Natamba et al., 2014; Radloff, 1977]) differed depending on pregnant women's social supports status (modified Duke-UNC social support scale [Broadhead, Gehlbach, De Gruy, & Kaplan, 1988]). Ours was a study motivated by previous research conducted among nonpregnant samples indicating that the association between food insecurity and depression varied depending on the respondent's level of social support. (Kollanoor-Samuel et al., 2011; Tsai et al., 2012) We also considered social support to be a moderator variable given the classical definition of a moderator, that is, a variable that changes the strength of the relationship between an independent variable (in our case food insecurity) and a dependent variable, CES-D score (Baron & Kenny, 1986). Women included in our study were midway (mean [standard deviation] gestational age: 19.3 [3.8] weeks) into their pregnancy. In our analyses, we used the median score on the social support scale to define pregnant women belonging to the low ($n = 178$) versus high ($n = 225$) social support categories. First, we conducted unadjusted and adjusted regression analyses for the association between food insecurity and CES-D score in the total sample ($n = 403$) and found a significant interaction between social support and food insecurity (adjusted p for interaction = .026). To better characterize the observed interaction, we re-ran our unadjusted and adjusted analyses for the food insecurity-depression score association separately by social support category and found that the studied association was stronger in the low social support group (adjusted beta (95%CIs): 0.91 (0.55; 1.27) than it was among women in the high social support category 0.53 (0.28–0.78). In our assessment, the observed differential strength of the association between food insecurity and depression score in the low versus high social support groups represents evidence of cross-sectional moderation as defined by Baron and Kenny (1986).

In the letter, the authors provide three main suggestions or observations that we wish to respond to, that is, (a) that we should

have presented adjusted R squared values for the multivariate linear regression models to help readers understand the explanation rate; (b) that like food insecurity, nutritional content is related to depression during the pregnancy and postpartum periods; and, (c) that we should conduct a risk assessment of food insecurity for its possible adverse effect on postpartum depression.

1. First, we wish to note that the R squared value is used to indicate the proportion of the sum of squares accounted for by a given model; and, it can be used as an estimator of a population parameter only when the independent variables in the model are exhaustive or a random representation of a population of all independent variables (Helland, 1987). In our study, we were not aiming to identify the extent to which all or specific independent variables in our models explained variation in depression (CES-D) scores. We conducted our analyses and presented our results based on the primary objective of the study, that is to determine whether the cross-sectional association (represented by the unadjusted and adjusted regression coefficients and their 95%CIs) between food insecurity and depressive symptoms score differed by the level of a third variable (social support category). We used conventional methods to identify and adjust for measured confounding variables. In the discussion section, we urged caution when interpreting our results given the cross-sectional nature of the study as well as the possibility of unmeasured confounding. As stated above, our analysis should not be interpreted as being exhaustive in accounting for all confounders (especially confounders that were not measured).
2. We probably agree with the authors of the letter in regard to their observation that adequate nutrition characterized by intake of foods that constitute a healthy dietary pattern during pregnancy is protectively related to perinatal depression (Chatzi et al., 2011). However, we used the term food insecurity as a multidimensional construct that encompasses both physical and economic access to a nutritionally diverse diet (FAO, WFP, & IFAD, 2012). Because of its multifaceted structure (i.e., involving availability, access, and utilization of food (FAO, 2008), food insecurity may impact pregnant and postpartum women's mental health through nutritional and non-nutritional pathways (Ivers & Cullen, 2011). Therefore, an innovative study would need to assess both food insecurity (as the primary exposure) and dietary intake (as a potential mediator) and then characterize the total, controlled-direct, and net-direct risk of perinatal depression attributable to food insecurity (VanderWeele & VanderWeele, 2015).

3. Lastly, and much as we agree with the authors regarding the importance of conducting a study on the risk of postpartum depression attributable to FI, we think that this suggestions is out of the scope of our paper. We studied the cross-sectional association between food insecurity and depressive symptoms severity among pregnant women and examined whether the strength of this association differed by women's social support status. Data were collected among pregnant women at about mid gestation. Results from our cross-sectional study were not meant to represent or attribute depression risk (whether during pregnancy or postpartum) to food insecurity, which we assessed during pregnancy. Any efforts to characterize food insecurity during pregnancy as a risk factor for antepartum or postpartum depression will require adequately powered cohort studies, use of valid diagnostics for both antepartum and postpartum depression and a meticulous consideration of all potential confounding variables; including for example, previous traumatic experiences, genetics, temperament, and interpersonal factors. (Kendler, Kessler, Neale, Heath, & Eaves, 1993; O'Hara, Neugebauer, & Zekoski, 1984) Such studies will no doubt build on results of our pioneering study but can also recognize and aim to address its limitations.

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