Author's response to reviews

Title: Demographic, health-related, and work-related factors associated with body mass index and body fat percentage among workers at six Connecticut manufacturing companies across different age groups: A cohort study.

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Author's response to reviews: see over
July 20, 2015

Attn: Clare Partridge, Executive Editor
BMC Obesity
BioMed Central
236 Gray's Inn Road
London WC1X 8HB
United Kingdom

Dear Dr. Partridge:

On behalf of my co-authors, we are pleased to submit a revised version of the original research article entitled, “Demographic, health-related, and work-related factors associated with body mass index and body fat percentage among manufacturing workers across different age groups: A cohort study” for consideration for review at BMC Obesity.

This paper addresses the often overlooked reality that obesity is a complex problem, associated with a variety of demographic and lifestyle factors that may vary by age, and is thus is not solved with a one-size-fits-all approach. In this study, part of a larger longitudinal study on the aging manufacturing workforce, we identified demographic, health-related, and work-related factors associated with differences in body mass index (BMI) and body fat percentage (BFP) among manufacturing workers across different age groups. We believe that our findings will facilitate the development of workplace interventions that are tailored to fit workers of different ages, to effectively reduce and prevent obesity.

Overall, the reviewers were supportive of our study, but requested that we add some details to the manuscript on our methods and rationale. We have addressed all comments in the revised manuscript and in a point-by-point response that is appended to the end of this cover letter. The editor also mentioned that we should copyedit the paper to improve the style of written English, and we have updated the manuscript accordingly.

We verify that the IRB committee at UConn Health approved this study design and that consent was obtained from all participants prior to their participation in this study. The findings reported in this manuscript have not been previously published, nor is this manuscript being considered for publication at other journals. None of the authors have any competing financial interests and all authors have read and agreed to the content of this manuscript.

Thank you for considering our manuscript for BMC Obesity.

Sincerely,

Alicia G. Dugan, PhD
Assistant Professor of Medicine
Reviewer's report

Title: Demographic, health-related, and work-related factors associated with body mass index and body fat percentage among workers at six Connecticut manufacturing companies across different age groups: A cohort study.

Version: 2

Date: 23 June 2015

Reviewer: Eshan Fernando

Reviewer's report:

COMMENT: Overall Garza and colleagues investigate an interesting and important relationship between work and markers of obesity. Incorporating BMI and BFP add an additional level of information allowing the authors to further investigate this relationship.

RESPONSE: Thank you for this positive feedback and your thoughtful comments on the manuscript. Please see our responses below.

Major Compulsory Issues

COMMENT 1: Full inclusion and exclusion criteria should be included in a supplementary appendix. For example, what was the cut-off for employee turnover rate cut-off.

RESPONSE 1: We have removed the statement on exclusion criteria, as no workplaces were actually excluded from the study and there were no constraints on individuals to participate in the study. We also added a reference to a previous study describing the cohort and recruitment procedure: “Details of site identification and study procedures at each company are available in a prior publication[23].”


COMMENT 2: The validity of the MSK pain questionnaire in the survey is unclear. Can additional references be provided validating this?

RESPONSE 2: The specific question used to assess MSK pain in this study has not been validated. However, we added a second reference of a published study that used this question to assess musculoskeletal pain as a primary outcome:

Minor Compulsory Issues

COMMENT 3: Within the background, line 85, please provide a specific reference for the statement “with almost 70% of American adults at an unhealthy weight status”. For example, CDC data, census data. Also is this based purely on weight or is it using measures such as BMI and BFP.

RESPONSE 3: We added the following reference to the manuscript:


Also, we now specify that this statistic is based on body mass index as a measure of weight.

COMMENT 4: Line 95-97: “The factors most strongly associated with obesity may differ for different groups of individuals such as those who work in different industries or who are in different age categories.” Within this sentence there is excessive use of the word different and differ

RESPONSE 4: We changed the sentence to read: “The factors most strongly associated with obesity may differ for individuals across industries or age categories” and have edited the manuscript to remove excessive repetition of words within sentences.

COMMENT 5: Is there a reason why 33 months were selected for BMI and BFP or is this simply a mean. Was there a targeted timeframe (ie 36 months initially)?

RESPONSE 5: Yes, the 33 months was the mean time between measurements. We rewrote that part of the methods section to clarify: “The current study used data on BMI and BFP collected from physical performance testing performed at two time points, time 1 and time 2, approximately 36 months apart (average time between collections 33 months), and demographic, health-related, and work-related factors collected from paper-and-pencil surveys conducted at time 1.”

COMMENT 6: Although including MSK related pain as a potential maker of limiting physical activity, there are other chronic health conditions such as cerebrovascular disease and lung disease, sleep apnea that are not assessed in this study. This can potentially lead to increased sedentary life and can impact obesity/body fat. As a result, this is a weakness in this study.

RESPONSE 6: We added the following statement to the limitations section of our discussion: “First, we were unable to include any measure of several important predictors of obesity including diet or energy intake or chronic health conditions such as cerebrovascular disease or sleep apnea in our analyses. Therefore, none of our results are adjusted for the effect of these factors, and it may be possible that the pathways by
which some of the demographic, health-related, or work-related factors identified in our study affect obesity go through diet or health conditions.

COMMENT 7: Combining adults who had children but did not have primary healthcare responsibilities with adults without children under 18 may not be appropriate as there is still significant responsibilities involved.

RESPONSE 7: Our intention was to dichotomize the childcare responsibility variable in a way that most meaningfully represents the highest and lowest levels of responsibility in providing childcare. People who have children living in their household, and those who have primary or shared responsibility for those children, commit substantial time and energy resources to childcare as compared to people whose children do not live in the same household and are the primary responsibility of another adult (Seltzer, 1991). Insufficient time and energy has been identified as an obstacle to self-care behaviors (healthy diet and exercise) that can impact weight (Dugan, 2010). For this reason, we grouped together people who had either primary or shared responsibility as the “high responsibility” group and those who had no children under 18 at home or whose children were the primary responsibility of another adult as the “low responsibility” group. To make this clearer in the manuscript, we changed the sentence to read: “Respondents checking that they had primary or shared responsibility were defined as having a high level of childcare responsibility, while those who indicated that they had no children under 18 at home or that another adult had primary responsibility were defined as having a low level of childcare responsibility.”


COMMENT 8: Could the decrease in BMI seen in age 55 be due to loss of muscle mass given the lack of significant difference in BFP by age?

RESPONSE 8: Based on table 2, we observed decreases in both BMI and BFP from time 1 to time 3 in the >55 year age group (Table 2). However, the point that BMI and BFP represent different constructs is well taken, and we have updated the paragraph on this in the discussion to incorporate your suggestion:

“We considered both BMI and BFP as indicators of obesity in this study because they may be characterizing obesity in different ways. BMI and BFP are not always correlated [48]; BMI incorporates total weight including muscle and fat mass, while BFP specifically considers body fat. As a result, BFP is expected to represent the health risks associated with obesity more accurately; however, BMI is more commonly used in the literature because it is easier to measure [48].”

COMMENT 9: Line 303 - was interested in changing weight - please proofread article for grammatical mistakes and tense. Also, please try to avoid repetitive use of the words in the same sentence where appropriate.
RESPONSE 9: We have carefully read the manuscript for grammatical mistakes and tense, and have rewritten sentences to avoid the repetitive use of words in the same sentence.

Discretionary Issues

COMMENT 10: In order for readers to quickly assess the population, it maybe useful to include average BMI within the result section.

RESPONSE 10: We changed the results section to read: “There were significant differences in baseline (p=0.04) and change in BMI (p<0.01) by age, with the >55 year age group having larger mean baseline BMI’s (29.7 compared to 28.7 for the <45 year age group) but also experiencing negative changes (decreases) in BMI from baseline to time 2 (-0.4 compared to 0.1 for the <45 year age group and 0.3 for the 45-55 year age group). There was also a significant (p<0.01) difference in baseline BFP by age, with participants in the <45 year age group having the lowest baseline BFPs (26.0 compared to 28.1 for the 45-55 year age group and 28.6 for the >55 year age group). We did not observe significant differences in change in BFP by age (p=0.08).”

COMMENT 11: It is unclear if “e.g.” is needed in line 92 and 93 when citing references. Consider removing.

RESPONSE 11: We removed the “e.g.” from the text.

COMMENT 12: An additional paragraph in the introduction and/or conclusion stating the relationship between obesity and health outcomes would add greater depth and relevance to the paper.

RESPONSE 12: We added the following sentence at the beginning of the introduction: “Obesity can have serious adverse health consequences including early death and heart disease {Prevention, 2015 #107}.”

COMMENT 13: Line 306 -When discussing high stress and the impact with baseline BFP perhaps use the statement "associated with a trend towards high baseline BFP although not statistically significant".

RESPONSE 13: We rewrote the sentence as suggested.

COMMENT 14: Perhaps a summary table outlining which factors impacted BMI and BFP in each group would provide a nice outline and easy to view information summarizing key findings in the study (ie list factors that did impact BMI in each age group without factors that did not).

RESPONSE 14: We added Figure 1 to summarize the factors impacting BMI and BFP in each group.
COMMENT 15: Regarding the statements begin in line 384, have their been studies looking at obesity in manufacturing or “blue collar” workers? It would be useful to relate to include these studies in the conclusion. If studies such as these do not exist, this would further emphasize the significance of this paper.

RESPONSE 15: We added the following information to the discussion to address this point: “Even compared to other studies among blue collar workers, we did not always observe the same results; for example, Duffy et al.[19] reported that low physical activity levels were significantly associated with obesity among operating engineers, while we found no association between physical activity and BMI or BFP in the current study. Workers across industries may have exposures or responses to different factors that may contribute to weight gain [20]. Therefore, it is important to identify industry-specific predictors of obesity when considering workplace interventions.”

COMMENT 16: Due to the nature of the study, causality cannot be established. As such, although there maybe an association, the true clinical impact is unclear. Adding a paragraph with respect to future directions or research gaps would be beneficial.

RESPONSE 16: We added the following information to the discussion to address this point: “Several strengths of this study should be noted. First, our study provided information specific to the manufacturing industry on factors associated with BMI and BFP by age, considering factors from multiple dimensions. Such information is needed in order to develop targeted, effective obesity interventions. The longitudinal design where factors were assessed at time 1 and used to predict changes in BMI and BFP from time 1 to 2 allows for temporality to be established for change in BMI and BPF, and although the cross-sectional analyses prevent causality from being established, they serve to identify groups that have higher BMI and BFP and may therefore benefit most from interventions.”

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare that I have no competing interests
Reviewer's report

Title: Demographic, health-related, and work-related factors associated with body mass index and body fat percentage among workers at six Connecticut manufacturing companies across different age groups: A cohort study.

Version: 2

Date: 28 May 2015

Reviewer: Jewel Gausman

Reviewer's report:

Major Compulsory Revisions

COMMENT 1: The authors measure social support with the Job Content Questionnaire to assess supervisory and peer support. The literature on social support discusses different types of social support (i.e. informational, instrumental, emotional, appraisal). Did the questions selected focus on a specific type of social support? If so, it would be helpful to understand the authors’ decisions in choosing the questions used to assess social support from the Job Content Questionnaire and what types of social support they attempted to measure. Ensuring that this is clear to the reader becomes especially important when examining the statistical models in which these responses are combined and dichotomized into one variable for analysis. (Lines 193-194)

RESPONSE 1: To address this point, we have included more information about the social support scale, which measures both instrumental and emotional support, as well as the exact questions that we used, in the methods section: Social support was measured with a subscale from the Job Content Questionnaire (JCQ: [31]) consisting of four items that assess instrumental and socioemotional social support from supervisors and coworkers including “(My supervisor is)/(People I work with are) helpful in getting the job done” and “(My supervisor/People I work with) take a personal interest in me”. Response options ranged on a 4-point scale from 1 (strongly disagree) to 4 (strongly agree) and a score was calculated by averaging ratings across the items.”

COMMENT 2: The authors include a wide range of very interesting variables in their analysis, however, given the number and range of variables, the manuscript would be much improved positioning it within a theory or theories that explains/contextualizes the hypothesized mechanistic relationship between the variables of interest and the outcomes, and justifies the use of the variables included. For example, the authors use the decision latitude variable from Karasek’s Demand-Control Model of workplace stress, however, they provide limited discussion of why this variable is important, and how it fits into the underlying relationship that they are attempting to explore between work stress and BMI and BFP. Additionally, the variables included on procedural norms and civility are very interesting, but I’m not sure how they fit independently into the theoretical model. It would be helpful to have this bigger picture described in
more depth to ensure that these pieces fit coherently together. (Paragraph beginning with lines 199-200).

RESPONSE 2: We have added some information to the introduction and discussion to describe the theory behind our selection of variables:

Introduction: “Yet, a variety of other factors are known to affect obesity. The Social Ecological Model, which emphasizes the relationships among multiple factors affecting health, can be applied to the study of obesity[8]. Studies have reported associations between demographic factors such as education, relationship status, and socioeconomic status and obesity ([9-11]). Work-related factors such as job stress, long working hours, and shift work have also been associated with obesity ([12-14]). Demographic or work-related factors can affect obesity through many pathways from directly influencing physiology to influencing diet or physical activity[15]. For example, chronic exposure to stress at work can result in neuroendocrine dysregulation[16], and may also lead to unhealthy behaviors[17].”

Discussion: “Our findings support the notion described in the Social Ecological Model that obesity is a multifactorial disease with many contributing factors that may differ across a worker’s lifespan [15, 8].”

Discussion: “Many of the work-related factors included in this study were selected because of their potential influence on workplace stress. Previous studies have demonstrated that a worker’s experience of stress at work can be affected by many factors such as civility[42], decision latitude[43], job satisfaction[44], procedural justice[45], and psychological demands[46]. Exposure to stress at work can result in neuroendocrine dysregulation[16], and may also lead to unhealthy behaviors[17], both of which may affect BMI or BFP.”

Discretionary Revisions

COMMENT 3: Was the Stress in General Scale validated with this population? Has it been used in a similar population before (184)?

RESPONSE 3: The Stress in General Scale has been validated with large, diverse samples of workers as described in the reference:


COMMENT 4: The paragraph beginning with line 94 could be strengthened by providing more specific discussion of the variables and specific pathways that will be examined in the study to improve the overall flow and coherence of the manuscript.
RESPONSE 4: We have added information to the previous paragraph to more clearly outline the variables and pathways that we have selected and our rationale for selecting them: “Yet, a variety of other factors are known to affect obesity. The Social Ecological Model, which emphasizes the relationships among multiple factors affecting health, can be applied to the study of obesity[8]. Studies have reported associations between demographic factors such as education, relationship status, and socioeconomic status and obesity ([9-11]). Work-related factors such as job stress, long working hours, and shift work have also been associated with obesity ([12-14]). Demographic or work-related factors can affect obesity through many pathways from directly influencing physiology to influencing diet or physical activity[15]. For example, chronic exposure to stress at work can result in neuroendocrine dysregulation[16], and may also lead to unhealthy behaviors[17].”

COMMENT 5: I appreciated the discussion of the double burden of women’s responsibilities in childcare responsibilities and work, and the resulting challenges associated with self-care. I thought that the authors did a nice job of integrating some discussion of gender differences in their discussion of BMI and BFP in the introduction as well as in the results. The authors could consider strengthening the discussion of the different mechanisms that operate to cause the observed patterning by gender. Additionally, the suggestions about interventions appropriate for individuals with limited time because of childcare responsibilities is fairly weak and could be expanded upon and linked back to the study population more specifically. (lines 367-372)

RESPONSE 5: Our study found that child care responsibility is a risk factor for BMI, but we did not specifically assess whether this is only applicable to the women in our study. It may be that both women and men with high levels of child care responsibility have higher BMI. It should be noted that our study found men were at risk for higher BMI, while women were at risk for higher BFP, across all age groups. Our discussion point about women’s home/family workload was not intended to be gender-specific, but to illustrate that a lack of time and energy for self-care may be the mechanism by which child care responsibility is associated with BMI. Given this, we have clarified the text about a suggested intervention to be more specific to people with child care responsibilities in general, and less focused on gender. We changed the sentence to read: “This is in line with other research such as a study of working mothers by Dugan which found that self-care behaviors (including physical exercise, healthy eating, and weight management) were associated with having available time and energy, resources that are often consumed by a cumulative workload consisting of paid work plus home/family work [40]. The study concluded that an effective intervention for this population would be one that takes place early in the day (e.g., a morning exercise class), ensuring that time and energy resources do not become depleted before people have an opportunity to use them for self-care.”

Level of interest: An article of importance in its field
Quality of written English: Acceptable
Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:
I declare that I have no competing interests