AI Message Diabetes Intervention: Post-Study Analysis

University of Oregon and the Arogya World Organization

We analyze behavior changes in both AI and non-AI participant groups based on their responses to the same questionnaire before/after joining our study. We divide questions into different categories that focus on *dietary*, *exercises*, and *knowledge*. Responses to each question are converted into three scores: 1 (low), 2 (medium), and 3 (high). The final score of a participant in each category is averaged over all questions in that category. We compute the score difference between the pre and post studies for each participant. Positive score changes imply participants improve their behavior at the end of our study.

To compare our AI intervention versus the non-AI intervention, we consider three statistics: (i) mean score change across each population; (ii) percentage of participants who improve their scores; and (iii) percentage of participants who decrease their scores. Besides the entire population, we also analyze our results based on age, gender, and education. For the AI group, we only consider participants who have response rates of at least 50%. Our rationale is that low-response rate participants do not engage in the AI study, and thus, their behavior will not be impacted by the AI messages.

1. AI vs non-AI Intervention Comparison Analysis

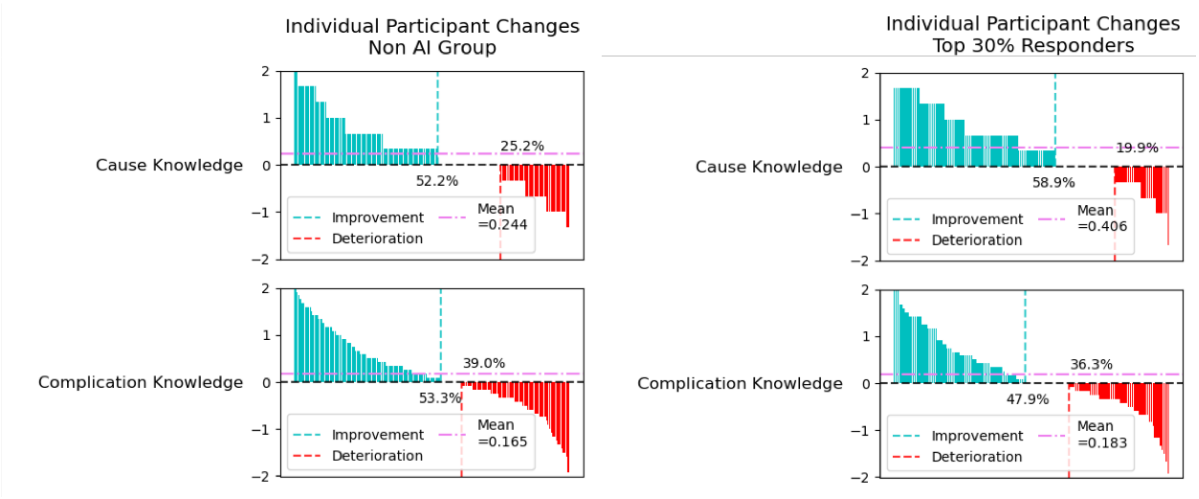

Figure 1. **Knowledge Comparison**. We plot results on *cause knowledge* (knowledge on causes of diabetes), and *complication knowledge* (knowledge on complications of diabetes). Overall, AI group shows a substantial improvement in both cause and complication knowledge scores. In particular, AI group outperforms the non-AI group significantly in cause knowledge. In complication knowledge, non-AI group has a higher percentage of participants who have positive score changes but also a higher percentage of participants who have negative score changes. Finally, the AI-group obtains a higher mean score improvement compared to the non-AI group.

Figure 2. **Physical Activity Comparison**. We plot results on *daily average exercise time*, *incidental exercise* (this refers to exercise incurred throughout daily activities, such as choosing to walk for errands, walking around the house, taking stairs instead of elevators, and doing farm work), and *sport/workout/walking*. Overall, AI group shows a substantial improvement in both average exercise time and incidental exercise, which outperforms the non-AI group. In the sports/workout/walking category, non-AI group has a higher percentage of participants who have positive score changes; nevertheless, the mean score change is not much different between the two groups.

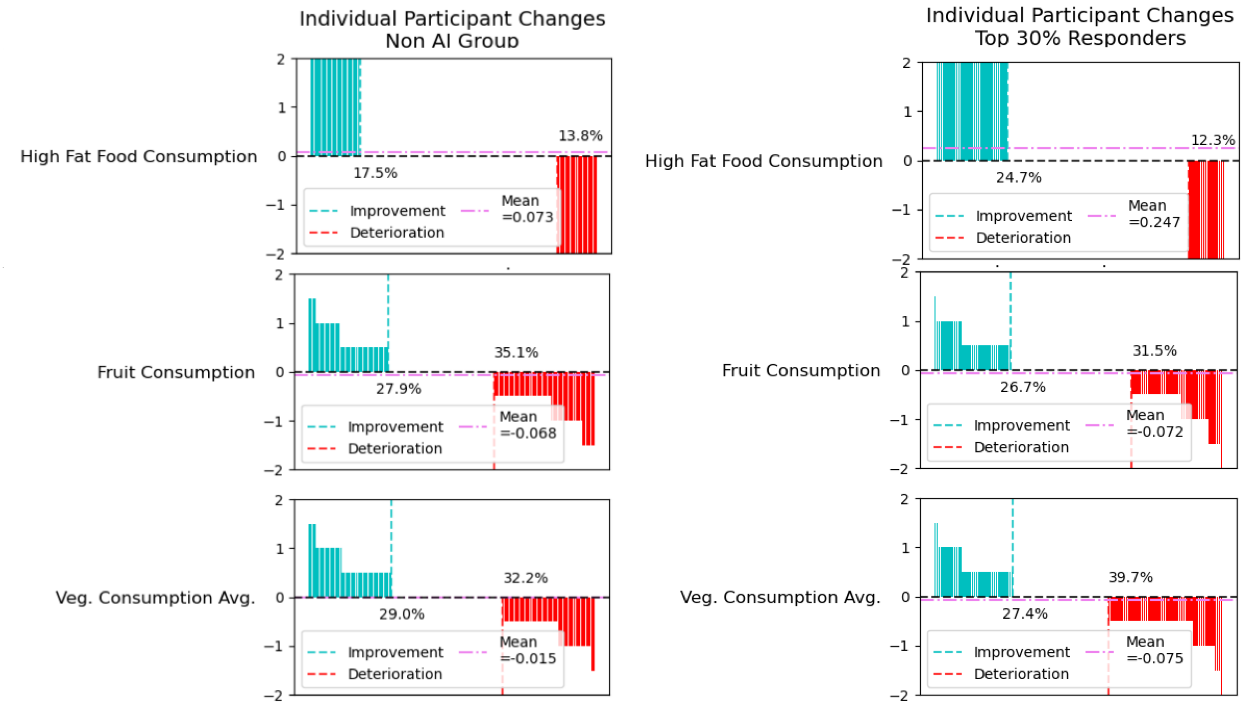

Figure 3. **Dietary Comparison**. We plot results on non-healthy food consumption, fruit consumption, and vegetable consumption. Overall, both non-AI and AI groups show behavior improvement in the non-healthy food consumption category (Higher percentage of participants has positive score changes compared to negative score changes. Also, the mean score change is positive in both group). More importantly, the AI group shows a substantially more improvement compared to non-AI group — (24.7% improvement, 12.3% deterioration, 0.247 mean) versus (17.5% improvement, 13.8% deterioration, 0.073 mean). On the fruit/vegetable category, on the other hand, we observe somewhat negative changes in both non-AI and AI groups. That is, higher percentage of participants has negative score changes compared to positive score changes. However, the mean score changes in both groups are very close to zero.

2. AI Intervention: Gender-based Analysis

Given that our AI intervention outperforms the non-AI intervention, we now look into impact of our AI intervention on different demographic groups. In this section, we will analyze behavior/knowledge changes based on gender.

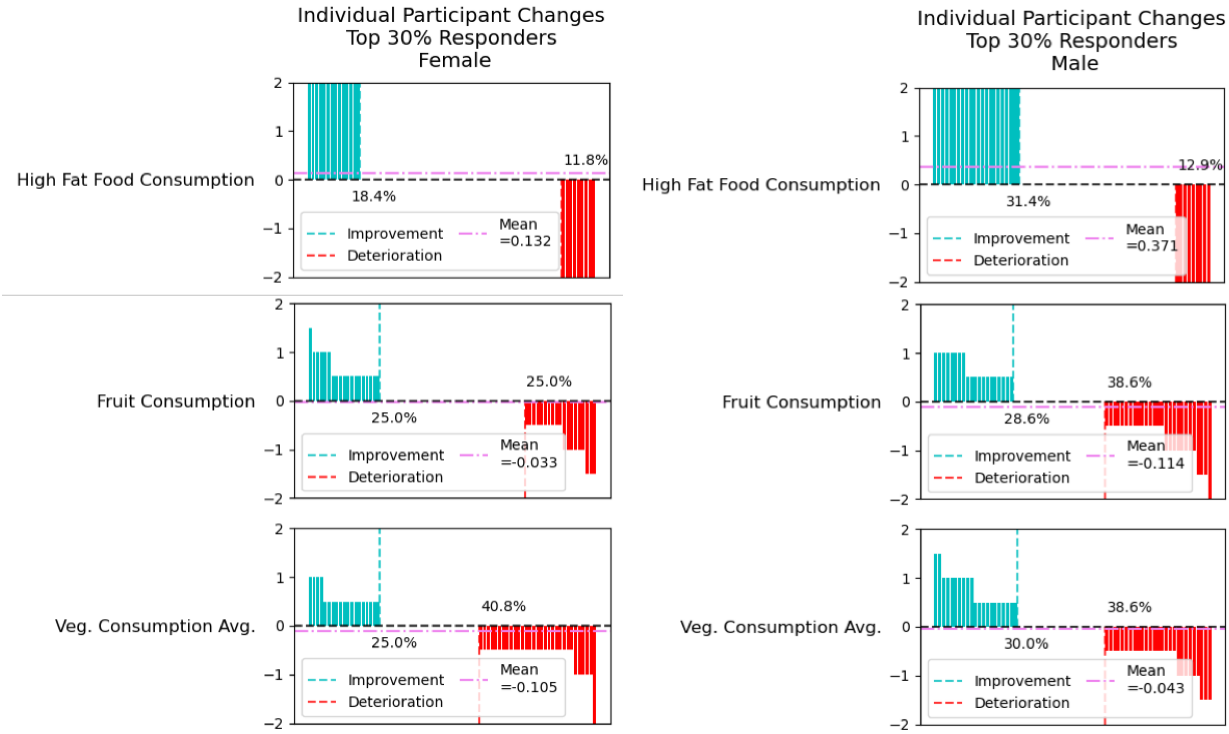

Figure 4. **Dietary Comparison**. Overall, AI intervention has a significantly more positive impact on male participants than female participants in the non-healthy food consumption. In the fruit/vegetable consumption, both male/female groups have similar slightly negative changes — though the mean score changes are very close to zero.

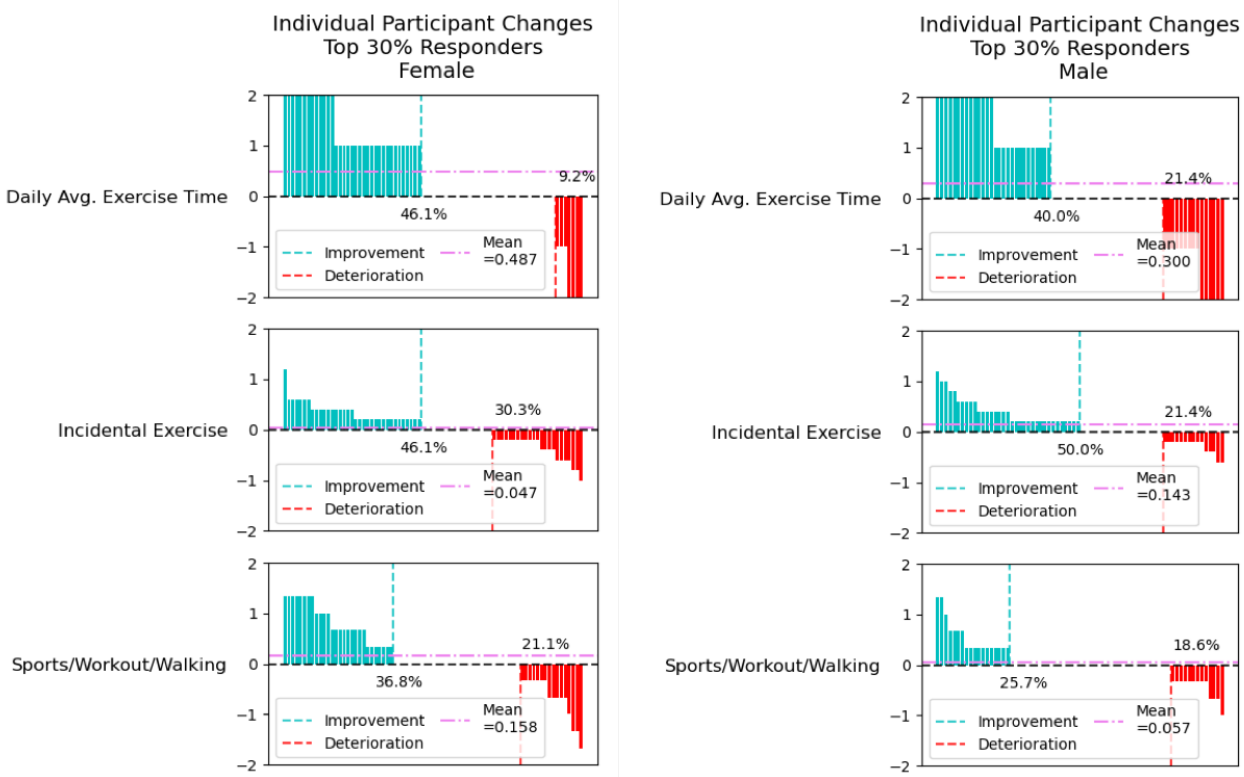

Figure 5. **Physical Activity Comparison**. Overall, AI intervention has a significantly more positive impact on female participants than male participants in both the daily exercise time and the sport/workout/walking categories. On the other hand, in the incidental exercise, the male group improve their behavior more than the female group.

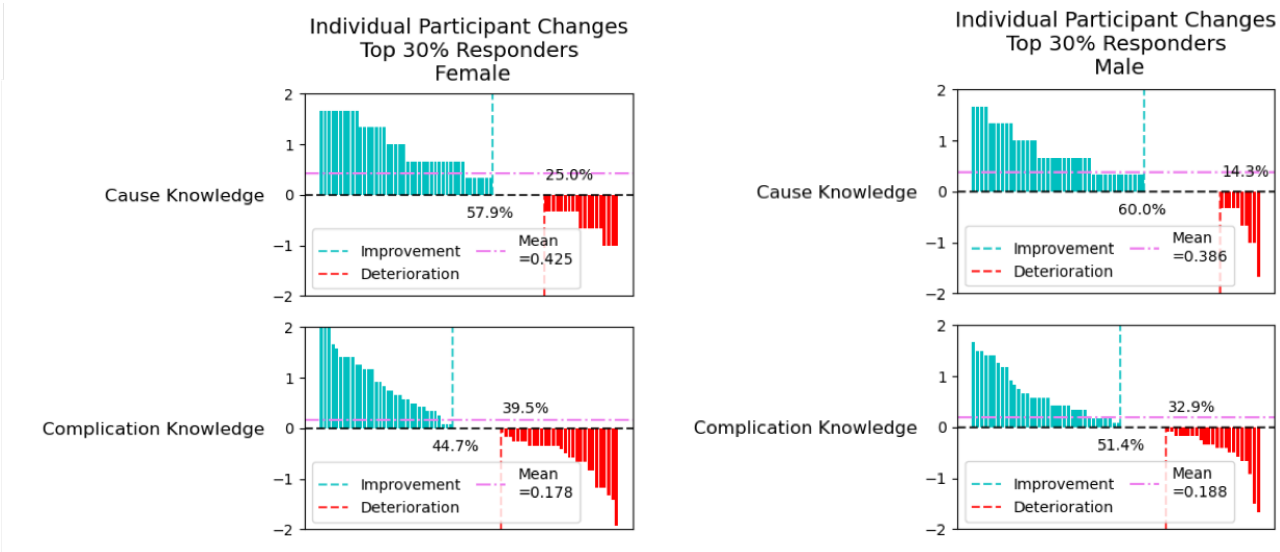

Figure 6. **Knowledge Comparison**. Overall, the percentage of female participants who improve their scores in both cause and complication knowledge categories are lower than the male participants. However, the mean score change in the cause knowledge for the female group is higher than the male group.

3. AI Intervention: Age-based Analysis

This section is devoted for age-based analysis. We consider two age-based groups: 18-35 years old and 35+ years old.

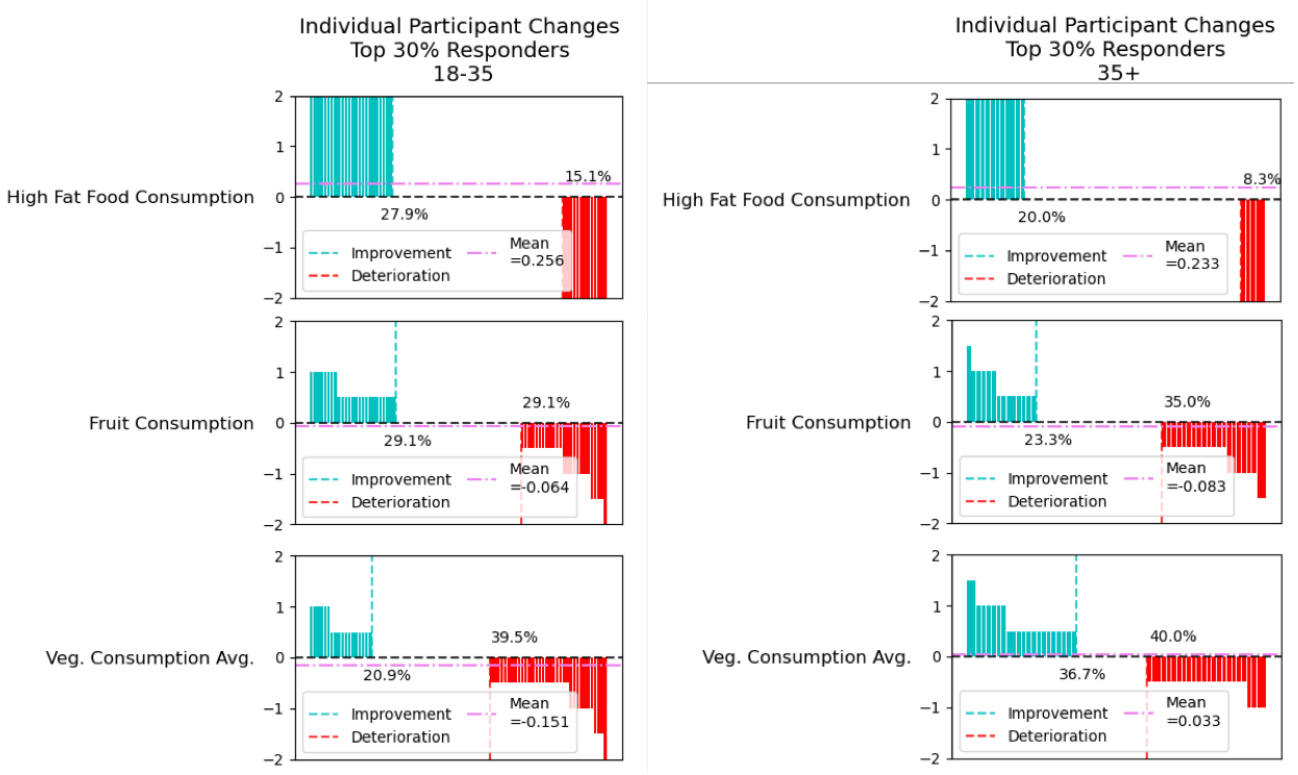

Figure 7. **Dietary Comparison**. Overall, the 18-35 group has a higher percentage of participants who improve their scores, but also higher percentage of participants who lower their score in the non-healthy food consumption compared to the 35+ group — the mean score change of this 18-35 group is slightly better than the 35+ group. On the other hand, the group of 35+ years old have a better vegetable consumption statistics but worse fruit consumption statistics than the group of 18-35 years old.

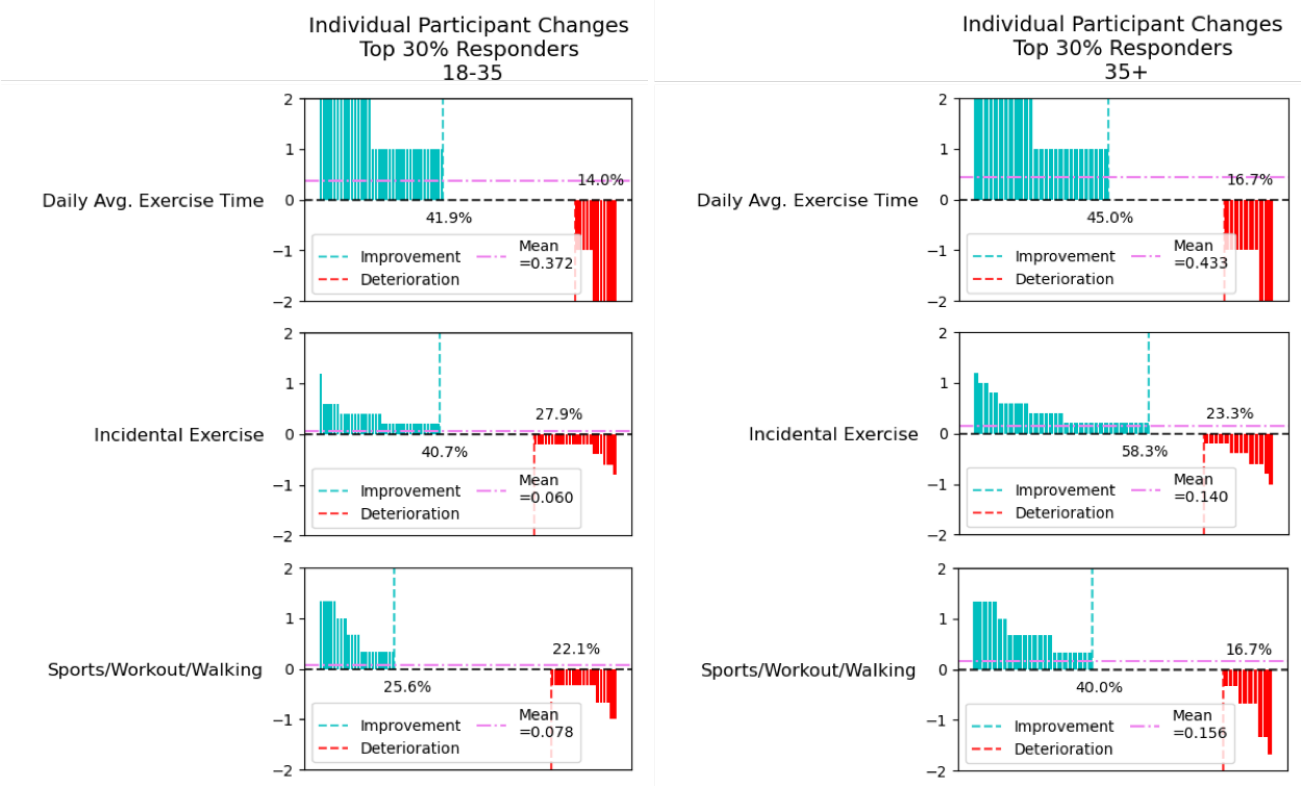

Figure 8. **Physical Activity Comparison**. Overall, the AI intervention has significantly higher positive impact on the 35+ group than the 18-35 group on all exercise-related categories.

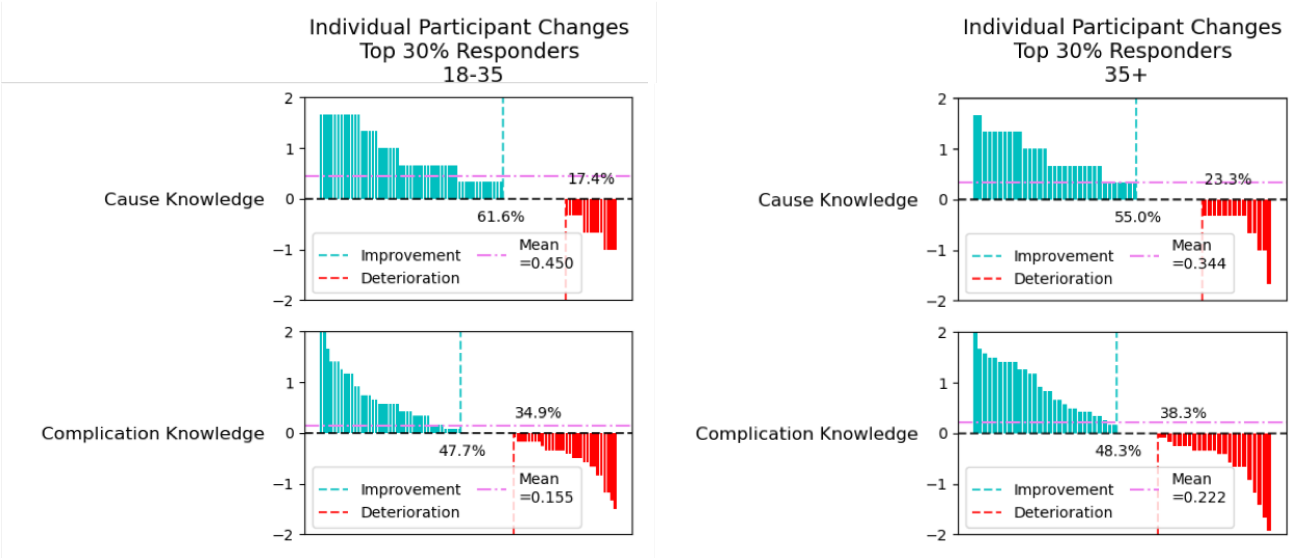

Figure 9. **Knowledge Comparison**. Overall, the AI intervention has higher positive impact on the 35+ group than the 18-35 group in complication knowledge category. The trend is opposite in the cause knowledge category.

4. AI Intervention: Education-based Analysis

This section is devoted for education-based analysis. We consider two education-based groups: some education and higher education.

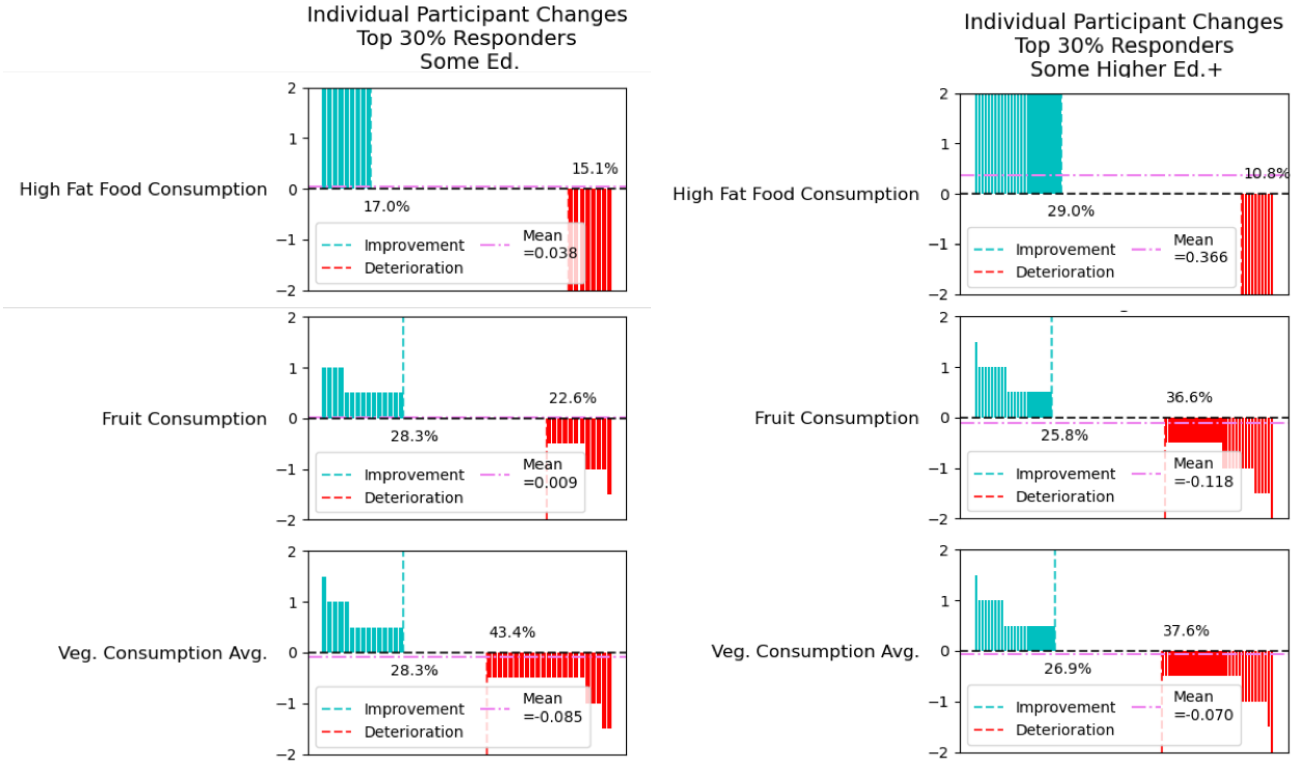

Figure 10. **Dietary Comparison**.

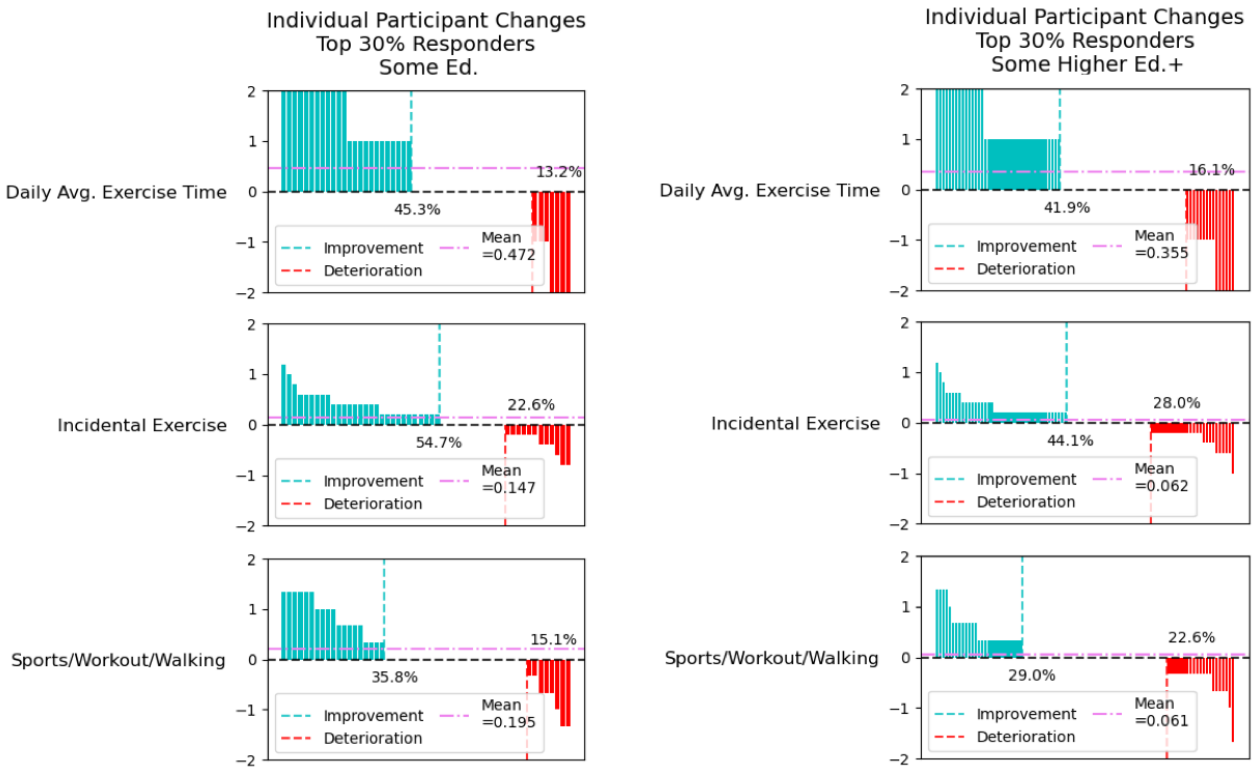

Figure 11. **Physical Activity Comparison**.

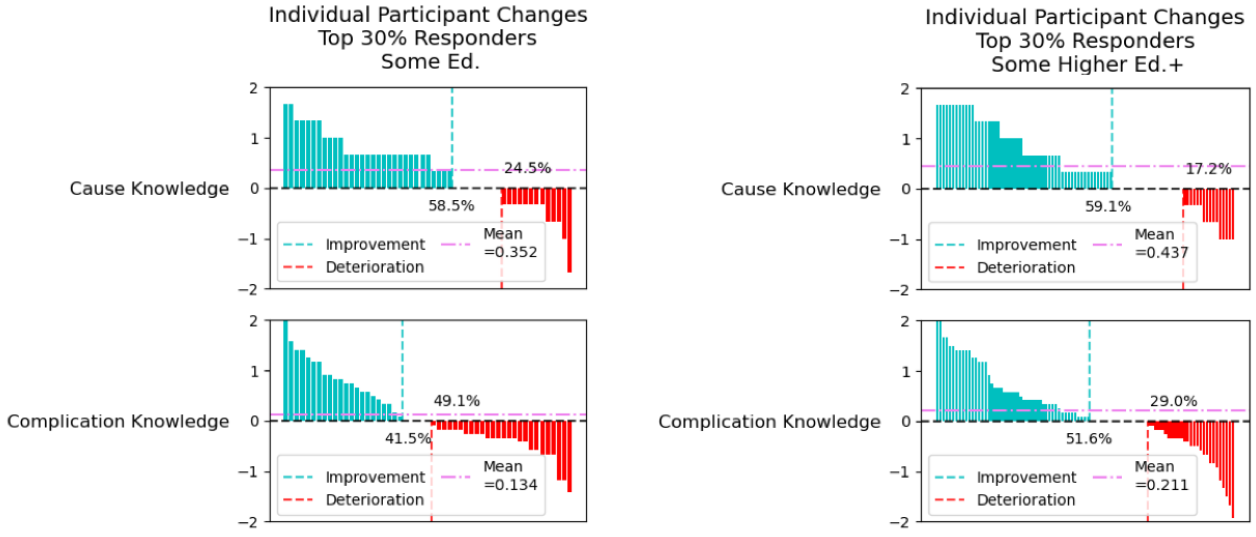

Figure 12. **Knowledge Comparison**.