Young people and adolescents have more irregular meals during the COVID-19 pandemic: A nested case-control study on chrono-nutrition before and during the COVID-19 pandemic

Bo Saals <sup>abe</sup>, H Myrthe Boss<sup>b</sup>, Gerda K Pot <sup>cde</sup>

<sup>°</sup>Division of Human Nutrition, Wageningen University & Research, Wageningen, the Netherlands; bHospital Gelderse Vallei, Ede, the Netherlands; cLouis Bolk Institute, Bunnik, the Netherlands; <sup>d</sup>Department of Nutritional Sciences, King's College London, London, UK; <sup>e</sup>Alliantie Voeding in de Zorg, Ede, the **Netherlands** 

### INTRODUCTION

Chrono-nutrition is an emerging field of research that includes three aspects of time: (1) regularity, (2) frequency, and (3) clock time. Due to the COVID-19 pandemic and the implemented lockdown, daily routines were disrupted, which presented a unique opportunity to investigate chrono-nutrition, in particular in adolescents.

## **METHODS**

A nested case-control study was conducted and information on chrononutrition was collected via an anonymous online questionnaire including 99 participants aged 13 to 20 years (N = 43 before the COVID-19 pandemic and N = 56 during the COVID-19 pandemic). Differences in chrono-nutrition were tested with chi-square and Mann-Whitney U.

# RESULTS

Table 1. Breakfast time, frequency (days) and regularity (%) before the COVID-19 pandemic (n=43) and during the COVID-19 pandemic (n=56).

Chrono-nutrition element	Breakfast before the COVID- 19 pandemic (n=43)	Breakfast during the COVID- 19 pandemic (n=56)
Clock time	9:12± 45 min	9:45 ± 53 min
Frequency (days)	5.3 ± 1.3*	4.4 ± 2.5*
Regularity (%)	65%*	34%*

<sup>\*</sup> Indicates statistical significance (P < 0.05)

## CONCLUSION

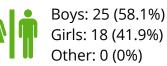
During the COVID19 pandemic, we observed in young people and adoloscensts that:

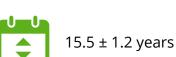
- Meal regularity declined during the COVID-19 pandemic.
- Meal frequency, especially snack consumption, increased.

This highlights the importance of maintaining a regular daily structure in order to avoid excessive energy intake via snacks.

#### **Baseline characteristics**

Before the **COVID-19 pandemic** 







 $62.6 \pm 9.3 \text{ kg}$ 





**COVID-19 pandemic** Boys: 25 (44.6%)

**During the** 



 $16.0 \pm 1.8 \text{ years}$ 

Girls: 27 (48.2%)

Other: 4 (7.1%)





62.9 ± 12.9 kg



During the COVID-19 pandemic, participants their consumed breakfast less regularly (34%)compared with participants before the COVID-19 pandemic (65%) (P = .003). Additionally, during the COVID-19 pandemic, participants consumed snacks in the morning (26% vs. 60%, P = .001), afternoon(19% vs. 81%, P < .000), and evening (22% vs. 84%, P < .001) less regularly.. 14%; P = .07).

However, the frequency afternoon (4.9 ± 2.2 times per week vs.  $3.8 \pm 1.9$  times per week, P = .002) and evening snacks (4.4 ± 2.4 times per week vs.  $3.4 \pm 2.0$ times per week, P = .02) was higher for participants during the COVID-19 pandemic. We also observed that participants reported more sleeping problems during the COVID-19 pandemic (34% vs. 14%; P = .07).







