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Physical Activity, Nutritional Habits and Sleeping Behavior in Health Professions Students and Employees of a Swiss University of Applied Sciences During the COVID-19 Lockdown Period: a Questionnaire Survey Study

Jan Taeymans, Eefje Luijckx, Slavko Rogan, Karin Haas, Heiner Baur

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Abstract

Background: The new coronavirus SARS-CoV-2 led to the COVID-19 pandemic since January 2020. The Swiss Federal Council prescribed a lockdown of non-essential businesses. Students and employees of institutions for higher education had to install home-office and online lectures.

Objective: The aim of this survey was to evaluate lifestyle habits such as physical activity (PA), sitting time, nutritional (expressed as median Mediterranean Diet Score; mMDS) and alcohol consumption habits and sleeping behavior during a two months period of confinement and social distancing due to the COVID-19 pandemic in students and employees of a Swiss University of Applied Sciences.

Methods: All students and employees from the Bern University of Applied Sciences – Department of Health Professions (Nursing, Nutrition and Dietetics, Midwifery, Physiotherapy) were invited to complete an anonymous online survey during the COVID-19 confinement period. Information on the lifestyle dimensions PA, sitting time, nutritional and alcohol consumption habits and sleep was gathered using adaptations of validated questionnaires. Frequency analyses and non-parametric statistical methods were used for data analyses. Significance was set at 5% level of alpha error.

Results: of this survey and subgroup analyses offer an opportunity to plan more group-specific health promotion interventions. Clinical Trial: ClinicalTrials.gov: NCT04502108

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Physical Activity, Nutritional Habits and Sleeping Behavior in Health Professions Students and Employees of a Swiss University of Applied Sciences During the COVID-19 Lockdown Period: a Questionnaire Survey Study

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Abstract

Background: The new coronavirus SARS-CoV-2 led to the COVID-19 pandemic since January 2020. The Swiss Federal Council prescribed a lockdown of non-essential businesses. Students and employees of higher education institutions had to install home office and participate in online lectures.

Objective: The aim of this survey was to evaluate lifestyle habits such as physical activity (PA), sitting time, nutritional (expressed as median Mediterranean Diet Score; mMDS) and alcohol consumption habits and sleeping behavior during a two month period of confinement and social distancing due to the COVID-19 pandemic. Survey participants were students and employees of a Swiss University of Applied Sciences.

Methods: All students and employees from Bern University of Applied Sciences – Department of Health Professions (Nursing, Nutrition & Dietetics, Midwifery, Physiotherapy) were invited to complete an anonymous online survey during the COVID-19 confinement period. Information on the lifestyle dimensions PA, sitting time, nutritional and alcohol consumption habits, and sleep was gathered using adaptations of validated questionnaires. Frequency analyses and non-parametric statistical methods were used for data analysis. Significance was set at 5% level of alpha error.

Results: Prevalence of non-health-enhancing PA was 37.1% with participants of the division of physiotherapy showing lowest prevalence. Prevalence of long sitting time (> 8 hours.day^{-1}) was 36.1%. Median mMDS was 9 (on max. 15) with participants of the division of Nutrition & Dietetics being more adherent to a Mediterranean diet as compared to the other groups. Prevalence of non-adherence to the Swiss alcohol consumption recommendations was 8.3%. Prevalence of low sleeping quality was 44.7% while median sleeping duration was eight hours, which is considered healthy for adult populations.

Conclusions: In the group analysis, differences in PA, sitting time and mMDS were observed between different divisions of health professions as well as between BSc and MSc students and employees. Therefore, public health messages regarding healthy lifestyle habits during home confinement should be more group specific.

The results of this study may provide support for the implementation of group-specific health promotion interventions at universities in pandemic conditions.

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Trial registration: ClinicalTrials.gov: NCT04502108

Keywords: Healthy lifestyle, Pandemics, Public health, Universities

Introduction

Background

The World Health Organization declared the new coronavirus SARS-CoV-2 leading to COVID-19 as a pandemic on March 11th, 2020 [1]. Five days later the Swiss Federal Council declared an “extraordinary situation” in terms of the Epidemics Act. Stringent measures were put in place [2]. All non-vital businesses as well as schools of all levels, including universities and universities of applied sciences, had to be closed. To contain the pandemic, the Swiss Federal Council called members of the public to remain at home in order to keep their distance from others.

This lockdown was immediately followed by the President of Bern University of Applied Sciences (BFH). Classroom teaching was forbidden. Students and employees had to remain at home, continuing their study and work in home office settings. Lecturers were asked to switch to digitalization to guarantee the continuation of the different educational programs during this second part of the spring 2020 academic semester and upcoming fall semester 2020/21 [3].

All sport infrastructure in Switzerland was forced to close during this nearly two-month lockdown period. While regular access to fitness clubs or sports facilities was no longer possible, individual walking, jogging and cycling, however, was still allowed. Food shops remained open during this period. Citizens were allowed to go outside for food supplies when adhering to the hygiene measures [2].

It can be hypothesized that such severe restrictions may have an influence on healthy lifestyles [4, 5]. Some international studies reported on lifestyle changes during home confinement. In Italy, the perception of weight gain was observed in 48.6% of the population and a slight increase in physical activity (PA) has been reported [6]. Another study with data from Western Asia, North Africa, Europe and other countries revealed that the COVID-19 home confinement has had a negative effect on all levels of PA and an increase in daily sitting time by more than 28% [7].

Hamer et al.[8] suggested that an unhealthy lifestyle synonymous with an elevated risk of

non-communicable disease is also a risk factor for COVID-19 hospital admission.

There is limited knowledge on lifestyle habits such as physical activity, physical inactivity (sitting time), nutritional and alcohol consumption habits, and sleeping behavior during an extraordinary period of two months confinement and social distancing in university students [9-12] and information regarding university employees is even more scarce.

Because of their health-profession-specific scholarly knowledge, differences in lifestyle habits between members of the different health profession divisions (e.g. between nutrition & dietetics and physiotherapy) can be expected. Furthermore, in the Swiss context, Bachelor of Science (BSc) programs of the different health profession divisions are full time while most of the Master of Science (MSc) programs are scheduled as part-time, allowing the latter students to combine study and work. Similarly, to the BSc students, most employees were also home confined. Thus, it can be hypothesized that differences in lifestyle habits during a lockdown period can be observed between these three groups of BSc students, MSc students and employees.

Because this pandemic is caused by a “new” corona virus lacking vaccination and treatment possibilities, predictions on the development of the pandemic (e.g. the rise of a “second wave” during winter) remains difficult. Increased knowledge about lifestyle habits of students and employees of the BFH Department of Health Professions (BFH-DHP) during such an extreme confinement situation may help heads and deans of academic institutions as well as other decision makers to counsel students and employees during a similar situation or in case of another outbreak in the future. However, due to the uniqueness of this COVID-19 crisis and its societal impact, such knowledge is currently lacking.

Objective

This study evaluated differences in lifestyle habits such as PA, sitting time, nutritional and alcohol consumption habits, and sleeping behavior during COVID-19 home confinement (spring 2020) with social distancing between BSc, MSc students and employees as well as between the four health profession divisions (i.e. nutrition & dietetics, midwifery, nursing, physiotherapy) of BFH–DHP (Switzerland).

Delineated research questions were *(i)* are there lifestyle differences between the four groups of health profession divisions (i.e. nutrition & dietetics, midwifery, nursing,

physiotherapy) during lockdown home confinement and *(ii)* are there lifestyle differences between the three groups of BSc students, MSc students and employees during lockdown home confinement?

Methods

This survey was conducted as an interdisciplinary collaboration between faculty members of the Physiotherapy and Nutrition & Dietetics divisions. A protocol of this observational study has been published elsewhere [13]. Here, a brief summary of the methods is presented.

Research design

For this study a self-reported electronic survey was conducted within the 2020 COVID-19 strict lockdown period assessing PA, sitting time, nutritional and alcohol consumption habits, and sleeping habits in students and employees of BFH-DHP, Switzerland.

Ethical issues were considered. Prior to the start of this survey the Dean of BFH-DHP was informed and approved this study. In the introductory section of the survey, eligible staff and students were informed that the survey was voluntary and anonymous, that no medical data will be asked for, and that they could contact the researchers for any information or further questions. Finally, it was explained that by filling out the survey and resubmitting it to the system, they explicitly accepted informed consent. The “EvaSys” software (EvaSys, Electric Paper Evaluationssysteme GmbH, Lüneburg, Germany) does not allow for any personal tracing of the respondents. The study was submitted to the ethical committee of Canton Bern. The EC declared that this anonymous survey without medical data did not need a full approval procedure (KEK Bern, Req-2020-00909) because it does not fall under the regulations of “Federal Act on Research involving Human Beings” in Switzerland. The survey has been registered at ClinicalTrials.gov (NCT04502108).

Study participants

All students (*n* = 1300; 88% Females and 12% Males) enrolled in BSc or MSc study programs in the field of nursing, nutrition & dietetics, midwifery and physiotherapy as well as all academic and non-academic employees (*n* = 268) from BFH-DPH were eligible and were invited to volunteer in this electronic survey.

Independent measures were BSc students, MSc students and employees as well as the four health profession divisions.

Data collection, data management and data analysis

The survey was sent via the Institute's email system to all staff and students on May 5th and remained open until May 15th 2020, to ensure a full COVID-19 confinement snapshot. A brief introduction section prior to the different questionnaires explained the objective of the survey. Automatized reminders were sent two times during this timeslot.

Data collection was performed anonymously using the "evaluation system software" of BFH-DPH (EvaSys, Electric Paper Evaluationssysteme GmbH, Lüneburg, Germany). A standardized questionnaire was developed within the EvaSys-framework including validated tools to assess PA and sitting time (i.e. the International Physical Activity Questionnaire Short Form (iPAQ-SF) [14] and to evaluate nutritional habits (i.e. a Swiss adaptation of the brief Mediterranean diet screener (bMDSC)) [15]. Questions on alcohol consumption and sleeping behavior were added to the survey, while for reasons of anonymity questions on socio-economic status were omitted. Lifestyle habits under evaluation were assessed during the seven days prior to filling out the survey. A complete description of the data management, cleansing and analysis can be consulted under supplementary online materials. A brief description follows.

iPAQ-SF assesses PA undertaken across four domains, including leisure time PA, domestic and gardening activities, work-related PA as well as transport-related PA. The iPAQ-SF evaluates three specific types of PA (i.e. walking, moderate-intensity and vigorous-intensity PA) undertaken in these four domains during the previous seven days. Time spent in the three types of PA was calculated and expressed in minutes. The iPAQ-SF algorithm was used to transform the continuous data into categorical data (i.e. "low", "moderate" and

"high, health-enhancing" PA) [14]. A reliability study of iPAQ-SF including 178 Swiss volunteers found fair to good reliability with Spearman correlation coefficients of 0.54 for total PA (MET-min.week^{-1}) and 0.60 for sitting [16].

The analysis of sitting time during the previous seven days was also conducted following the iPAQ guidelines.

A Swiss adaptation of the brief Mediterranean diet screener (bMDSC) was used to assess nutritional habits and adherence to the Mediterranean diet, which has been proposed as a healthy eating pattern because of its high content of antioxidant food items. Volunteers were asked to report their adherence to a recommended consumption frequency of fifteen selected food items during the preceding seven days. Answer categories were "Yes" or "No". Healthy items scored "1" if answered with "Yes" and "0" otherwise, while unhealthy items were reverse coded. Scores were summed to calculate a modified Mediterranean diet score (mMDS). Maximal score is 15 with higher scoring indicating a better adherence to the Mediterranean diet. A validation study including 102 participants reported an ICC of 0.4 ($p < .001$) between mMDS derived from the bMDSC and a 24-hour recall index. Reported limits of agreements were 59% and 144%. The authors concluded that the bMDSC is a valid tool for rapid assessment of dietary quality [15].

Daily wine, beer and spirits (liquor) consumption during the preceding seven days was given in units (glasses). While there is evidence that drinking patterns may matter more than the type of alcohol [17, 18] consumption itself, it has also been proposed that adherence to a Mediterranean Diet with a moderate wine intake (during) meals could explain the observed lower prevalence of cardiovascular disorders in Southern Europe as compared to Northern Europe. Furthermore, wine and spirits are more expensive than beer [19]. Therefore, in addition to alcohol intake frequency data, this study wanted to differentiate between the types of alcohol consumed.

Sleeping behavior during the preceding seven days was given as time to go to bed and wake-up time. Sleeping duration was calculated as the difference between these two times. Quality of sleep was asked to be rated as "No sleeping problems", "Sleeping quality could be improved" or "Important sleeping problems".

Data management was conducted on the institutional server while data cleansing was performed by one researcher (JT) to check for incompatibilities and to control plausibility of the data (e.g. range checks). The International Physical Activity Questionnaire Short Form (iPAQ-SF) data cleansing rules were followed: participants with incomplete data

or who mentioned “don’t know” where removed from the analysis [14].

Statistical analyses

Frequency analyses and non-parametric statistics were used to report the results of this survey. For the descriptive analyses, central tendencies were expressed as medians while variation was reported using the 25th and 75th percentiles (P_{25} and P_{75}) and interquartile ranges (IQR). Kruskal-Wallis tests and Whitney-U Tests with post-hoc Bonferroni corrections were used to assess differences between independent groups (i.e. between BSc and MSc students and employees as well as between members of the four divisions). Results are presented as frequency tables or as figures with boxplots.

Date were prepared in Excel (Microsoft Corporation, 2018.) but imported into the Statistical Package for the Social Sciences version 26 (IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.) for statistical analyses. Statistical significance was set at the 5% level of error.

Results

A total of 821 participants (BSc students = 616, MSc students = 100, employees = 105) volunteered for this online survey. Students’ and employees’ response rates were 55.1% and 39.2% respectively. Respondents adhered to the division of nutrition & dietetics (*n* = 119; 14.5%), midwifery (*n* = 109; 13.3%), nursing (*n* = 309; 37.6%) and physiotherapy (*n* = 284; 34.6%).

Because incomplete files were excluded from the different analyses, the sample sizes were reduced to *n* = 650 (PA), *n* = 761 (sitting time), *n* = 771 (nutritional habits), *n* = 815 (alcohol consumption), *n* = 796 (sleeping time and quality).

Physical Activity

In this sample of 650 respondents, never engaging in vigorous PA, moderate PA or walking during the preceding seven days was reported by 67 (10.3%), 44 (6.8%) and 18 (2.8%) participants respectively. Four volunteers did not participate in any of the three PA types. The median MET-min.week^{-1} score was 3447 [IQR: 2117 to 5396]. Of the 650

volunteers, 30 (4.6%) were classified as “low”, 211 (32.5%) as “moderate” and 409 (62.9%) as “high” for physical activity.

Figure 1 presents the boxplots of the summed MET-min.week^{-1} scores for the four different health profession divisions (i.e. nutrition & dietetics, midwifery, nursing, physiotherapy respectively). Participants of the division of nutrition & dietetics showed a lower median summed MET-min.week^{-1} score compared to those of the division of physiotherapy (P = .001). The other observed differences between divisions were not statistically significant (P > .05). Calculated values of boxplots and whiskers are presented in a supplementary table 1.

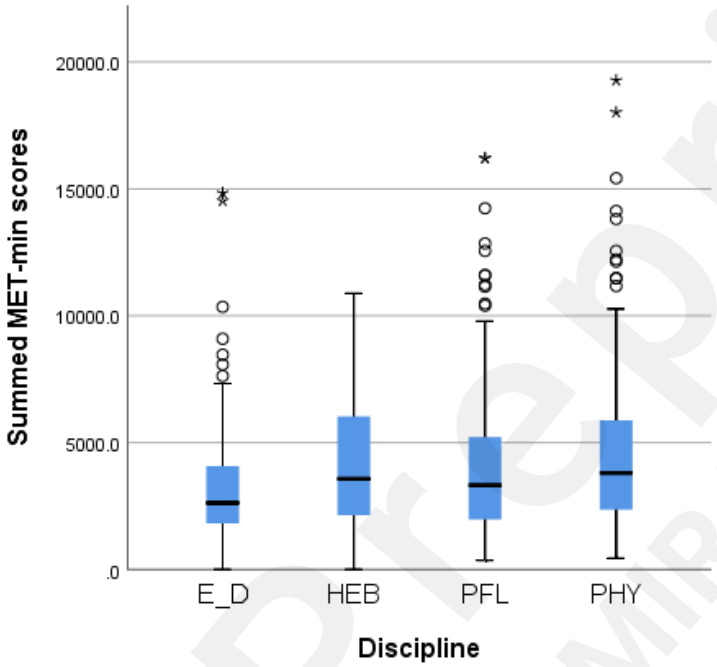

Figure 1: Boxplots of the physical activity scores (summed MET-min.week^{-1}) per health profession division of a Swiss university of applied sciences (health professions) during the spring 2020 COVID-19 lockdown
Legend: E_D = Nutrition & Dietetics; HEB = Midwifery; PFL = Nursing; PHY = Whiskers indicate [1.5 x Inter Quartile Range] unless truncated at lowest score.

Table 1 shows the absolute and relative frequencies of the categories “low”, “moderate” and “high, health enhancing” PA in the groups of the four health profession divisions. The highest relative frequency of “high” PA was found in the participants of the division of physiotherapy (74.2%) while the highest relative frequency of “low” PA was observed in the volunteers of the division of midwifery (10.1%). Table 1 depicts the absolute and relative frequencies of the classification in “low”, “moderate” and “high” PA for the 650

participants of the two student groups (BSc and MSc) and the employees' group. The highest relative frequency of "high" PA was found in the group of MSc students (68.4%) while the highest relative frequency of "low" PA was observed in the employees' group (9.9%)

Table 1: Absolute and relative frequencies of the categorized physical activity data (of the preceding 7 days) of 650 students and employees of a Swiss university of applied sciences during the spring 2020 COVID-19 lockdown per health profession division and per student level and for the employees' group.

	High	**Low**	**Moderate**	**Total**
	***n* (%)**	***n* (%)**	***n* (%)**	***n* (%)**
Nutrition & dietetics Frequency	49 (49)	3 (3)	47 (48)	99 (100)
Midwifery Frequency	47 (60)	8 (10)	24 (30)	79 (100)
Nursing Frequency	138 (59)	12 (5)	86 (36)	236 (100)
Physiotherapy Frequency	175 (74)	7 (3)	54 (23)	236 (100)
BSc Students Frequency	307 (64)	20 (4)	143 (32)	480 (100)
MSc Students Frequency	54 (68)	1 (1)	24 (30)	79 (100)
Employees Frequency	48 (53)	9 (10)	34 (37)	91 (100)

Figure 2 shows the boxplots of the summed MET-min.week^{-1} scores for the BSc student, MSc student and employee groups. The employee group showed a lower median summed MET-min.week^{-1} score compared to the group of MSc students (P = .002) and the group of BSc students (P = .041). There was no difference in the median MET-min.week^{-1} score between BSc and MSc student groups (p = .120). Calculated values of boxplots and whiskers are presented in a supplementary table 1.

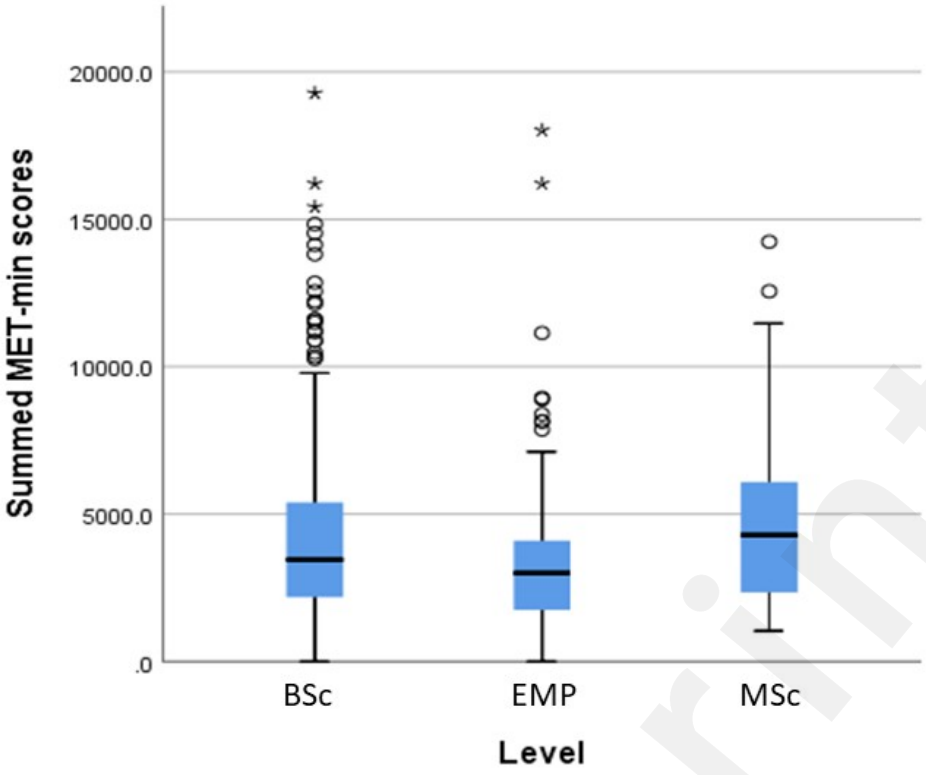

Figure 2: Boxplots of the physical activity scores (summed MET-min.week^{-1}) per group of student level and the employees' group in 650 students and employees of a Swiss university of applied sciences (health professions) during the spring 2020 COVID-19 lockdown.
Legend: BSc and MSc = student level; EMP = employees Whiskers indicate [1.5 x Inter Quartile Range] unless truncated at lowest score.

Sitting time

A total of 761 out of the 821 respondents (92.7%) were included in this analysis. Median sitting time was 420 minutes per day [IQR: 300 to 540 min.day^{-1}]. Figure 3 (left) depicts the boxplots of the daily sitting time for members of the four different health profession divisions. Participants from the nutrition & dietetics division had higher median daily sitting time values compared to those from the other health profession divisions (all comparisons $P < .001$). Figure 3 (right) presents the boxplots of daily sitting time values for the BSc students, MSc students and employee groups. Employees had a higher median daily sitting time value compared to those from the BSc and MSc students (all comparisons $p < .001$).

BSc students showed higher median daily sitting time values compared to those of the MSc students (*P* < .001). Calculated values of boxplots and whiskers are presented in a supplementary table 1.

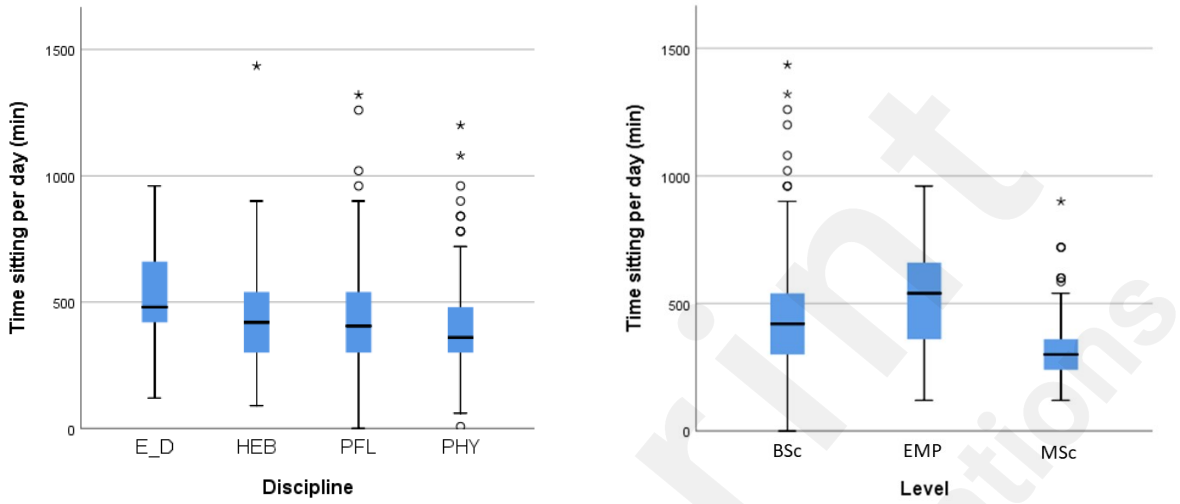

Figure 3 (left): Boxplots of the daily sitting times (in minutes) per health profession division in 761 students and employees of a Swiss university of applied sciences during the spring 2020 COVID-19 lockdown. (right): Boxplots of the daily sitting time (in minutes) per group of student level and the employees' group in 721 students and employees.
Legend: E_D = Nutrition & Dietetics; HEB = Midwifery; PFL = Nursing; PHY = Physiotherapy; BSc and MSc = students' level; EMP = employees. Whiskers indicate [1.5 x Inter Quartile Range] unless truncated at lowest score.

Nutritional habits

A total of 771 out of the 821 respondents (93.9%) could be included in this analysis. Median modified Mediterranean Diet Score (mMDS) in this sample was 11 [IQR: 9 to 12]. The lowest mMDS observed in this sample was 2 (*n* = 1) while eight persons were fully adherent to the Mediterranean diet (mMDS = 15).

Figure 4 depicts the boxplots of the mMDS for members of the four different health profession divisions. Participants from the division of nutrition & dietetics had higher median mMDS compared to those from the divisions of nursing and physiotherapy (both comparisons *p* < .001) or the division of midwifery (P = .033). The median mMDS of the

participants from the division of midwifery was higher compared to the participants from the division of nursing (*P* = .047). Calculated values of boxplots and whiskers are presented in a supplementary table 1.

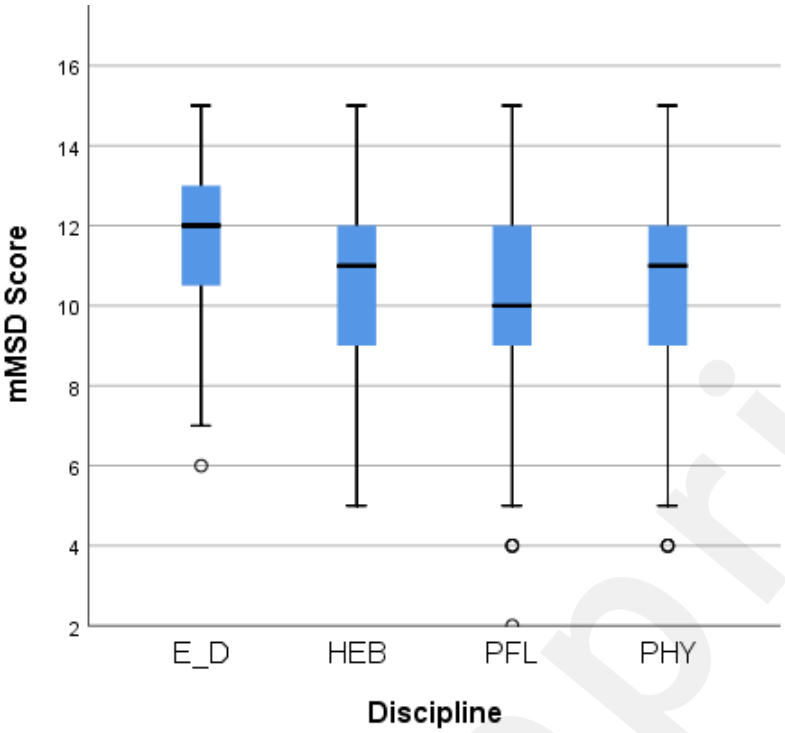

Figure 4: Boxplots of the eating habits (mMDS) per health profession division in 771 students and employees of a Swiss university of applied sciences during the spring 2020 COVID-19 lockdown.
Legend: E_D = Nutrition & Dietetics; HEB = Midwifery; PFL = Nursing; PHY = Physiotherapy. Whiskers indicate [1.5 x Inter Quartile Range] unless truncated at lowest score.

No differences between BSc students, MSc students and the employees (*P* = .168) were found.

Alcohol consumption

A total of 815 out of the 821 respondents (99.3%) were included in this analysis. Table 2 shows the absolute and relative frequencies of the different types of alcohol consumption in these 815 participants. Over 80% of the volunteers reported no wine or beer consumption over the preceding seven days while nearly 97% reported no liquor or spirits consumption over the same period. Around 18% of the respondents adhere to the Mediterranean diet guideline of two units of wine per day. Twenty three out of the 815

participants (2.8%) reported daily combinations of the different types of alcohol consumption above three units per day. Two participants (0.2%) reported an excessive alcohol consumption of more than seven units of all types of drinks per day.

Table 2: Absolute and relative frequencies of the different types of alcohol consumption (over the preceding seven days) of 815 students and employees of a a Swiss university of applied sciences (health professions) during the spring 2020 COVID-19 lockdown.

	0 ***n*** **(%)**	**1** ***n*** **(%)**	**2** ***n*** **(%)**	**3** ***n*** **(%)**	**4 to 7** ***n*** **(%)**	**>7** ***n*** **(%)**	**Total** ***n*** **(%)**
Units wine per day	651(80)	134 (16)	12 (2)	0 (0)	11 (1)	7 (1)	815 (100)
Units beer per day	685 (84)	109 (13)	14 (2)	4 (1)	1 (<1)	2 (<1)	815 (100)
Units liquor or spirit per day	788 (97)	20 (3)	3 (<1)	2 (<1)	0 (0)	2 (<1)	815 (100)

No differences in alcohol consumption were observed between the four health profession division groups (p > .050). Similarly, no group differences between the BSc students, MSc students and employees' groups was found (P > .050).

Sleeping behavior

A total of 796 out of the 821 respondents (96.9%) were included in this analysis. Of those, 44 (5.5%) reported bad sleeping quality, 312 (39.2%) found that sleeping quality could be improved while 440 (55.3%) reported good sleeping quality.

No differences in sleeping quality were observed between the four health profession division groups (P > .050). Similarly, no group differences between the BSc students, MSc students and employees' groups were found (P > .050).

In this sample 253 (31.8%) reported going to bed at 11 p.m. One volunteer mentioned bedtime at 7.30 p.m. while another respondent went to bed at 3.30 a.m. A total of 176 persons (22.1%) reported to wake-up at 7 a.m. One participant mentioned a wake-up time of 4 a.m. while another mentioned not getting out of bed before noon. Median sleep duration in this sample was eight hours [IQR: 7.8 to 9.0 hours].

No group differences for bedtime, wake-up time and sleep duration between the four different health profession division groups were found (all comparisons P > .050).

No group difference between BSc students, MSc students and employees was found for bedtime (p = .152). Figure 5 presents the boxplots of the wake-up time for those three

groups. Median wake-up time was later in the BSc students' group compared to the MSc students' and employees' groups (both P < .001). Calculated values of boxplots and whiskers are presented in a supplementary table 1.

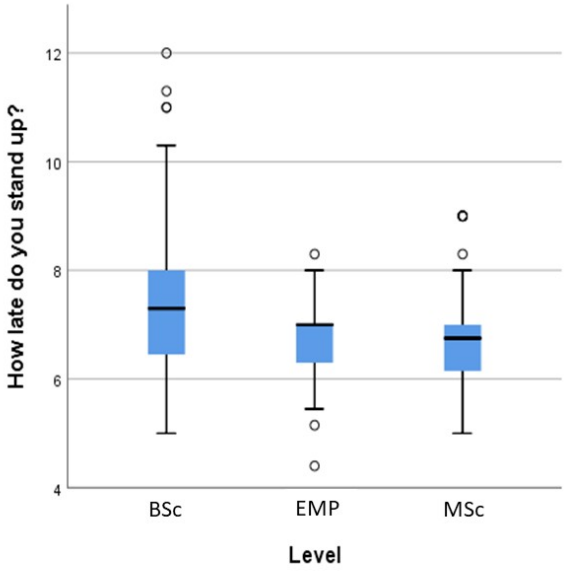

Figure 5. Boxplot of wake-up time per group of student level and the employees' group in 796 students and employees of a Swiss university of applied sciences (health professions) during the spring 2020 COVID-19 lockdown.
Legend: BSc and MSc = students' level; EMP = employees.

Discussion

This study found differences in PA, sitting time, nutritional and alcohol consumption habits, and sleeping behavior between BSc students, MSc students and employees as well as between the four health profession divisions (i.e. nutrition & dietetics, midwifery, nursing, physiotherapy) of a university of applied sciences in Switzerland during COVID-19 home confinement (spring 2020) with social distancing.

In the same period similar initiatives in the general population were launched by other institutions. For example, an Italian survey including 398 university students, used the International Physical Activity Questionnaire to assess physical activity and sedentary behavior during COVID-19 lockdown in spring 2020. Lockdown sedentary behavior was greater than before lockdown (*P* = .003). While closure of the university increased sedentary behavior across the sample, it only decreased physical activity in participants who were the most active before lockdown [20].

In the present study, response rates of students (55.1%) and employees (39.2%) were higher than expected in the study protocol (30%) [13]. Participants from the nursing and physiotherapy divisions together represented 72% of the total respondents (*n* = 821). Both divisions also contribute the largest numbers of students and employees in the total BFH-DHP population. BSc students are six times more represented in this study sample than MSc students or employees. Undergraduate students also represent the highest number in the total BFH-DHP population.

During the 2020 COVID-19 confinement period, about 90% of the 650 respondents that could be included in the PA analysis were engaging in one of the three types of PA (vigorous PA, moderate PA, or walking) during the preceding seven days before filling out the survey questionnaires. On an individual level, four participants reported never to have participated in such activities over the previous seven days. The median summed MET-min.week-1 score was 3447 but with large variation [IQR: 2117 to 5396]. iPAQ-SF is interpreting the results from the perspective of health enhancing effects: 4.6% of the respondents were classified as “inactive”, 32.5% as “minimally active” and 62.9% as “health enhancing physically active”. Persons classified to the latter group participated in PA bouts with evidence of health enhancing effects [14]. These results are lower than the data from the Swiss Health Survey 2017, where the proportion of trained and sufficiently active people who meet the physical activity recommendations is 76% [21]. Only participants from the division of physiotherapy (74.2%) met these criteria of health enhancing PA during confinement. Participants from the division of nutrition & dietetics showed the lowest median PA level. The proportion of inactive or insufficiently active persons in this present study is comparable with the Swiss health survey. The observed difference between these two groups was 85 MET.min representing a short walking tour of 15 minutes for 5 days a week. When summed-up over time, even small differences may become clinically relevant. The importance of PA is known. Active muscles produce chemicals that improve immune functioning, which in turn reduces the extent of infections, and decreases inflammation, and these are the main causes of the lung damage from severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection [22].

Students had a higher median PA level compared to employees. It is interesting to note that in this specific sample of health profession students and employees, 37.1% were not participating at a health enhancing PA level. Being a health profession student or health

professional may not always have a protective effect against unhealthy lifestyle habits [23-25]. It is encouraging to observe that participants from the division of physiotherapy, those who are (or have been) trained to become movement science experts, showed the highest median PA levels. It can be argued that participants in this specific sample have on average a higher health literacy than their peers from other faculties and thus, an underestimation of the number of participants not adhering to a health enhancing PA level cannot be excluded at the total university of applied sciences population level.

Results of this survey suggest that incentives, organized by universities may be needed to empower students and employees more specifically. For example, action plans for workplace health promotions may be developed with a special focus on digital dissemination paths to reach students and employees in their home office settings.

Median sitting time in this sample during the preceding seven days was seven hours per day with a prevalence of long sitting time (> 8 hours.day^{-1}) of 36.1%, which is higher compared to Swiss data, where 25% of the employed persons sit for more than 8 hours a day [21]. The prevalence of long sitting time in university students under normal, non-confinement conditions is high and its effect on cognition and academic performance is not well studied yet. A Spanish study including 372 undergraduate university students concluded that introducing health promotion programs into university settings to replace leisure sitting time with moderate PA may contribute to enhanced student performance [26]. Participants from the nutrition & dietetics division showed the highest median sitting time (8 hours.day^{-1}) compared to their peers from the other health disciplines. The median sitting time for employees during the COVID-19 confinement period was more than eight hours. The observed higher sitting time for BSc students as compared to their peers at the MSc level can be at least partially be explained by the type of study program. While most BSc programs are full time, most MSc programs at BFH-DHP are part time. Even under strict confinement conditions, most graduate students were still working in the healthcare sector and, hence, this might have resulted in less sitting time as compared to their undergraduate peers.

The findings for PA and sitting time may have important public health implications. For example, health promotion campaigns to increase PA and reduce physical inactivity should focus on employees and students, especially those in the nutrition & dietetics

division. They should be empowered to participate in health-enhancing physical activities and to reduce daily sitting time in periods with strict confinement conditions when fitness centers and other sport facilities are closed. This study gives an opportunity to implement a module on healthy PA in the curriculum of the nutrition & dietetics division (and possibly in those for nursing and midwifery) of BFH-DHP. Furthermore, the BFH-DHP team for workplace health promotion might plan a similar module specifically for employees. Measures should be instigated to detect the very small group of physically inactive students and employees and to increase their health literacy on the negative effects of a totally sedentary lifestyle. Notwithstanding regular modifications of the curriculum, ad-hoc action plans for an acute pandemic situation consisting of mainly digital distribution pathways may help and empower students and employees during similar lockdown situations.

Adherence to the Mediterranean Diet during the preceding seven days, as a reference for a healthy eating pattern [15] in this study, yielded a median mMDS of 11 [IQR: 9 to 12] on a maximal score of 15. A total of 142 out of the 771 respondents (18.4%) included in the nutritional analyses showed low adherence ($P_{25} < 9$) to a healthy eating pattern during the confinement period. Undesirable changes to diet patterns have the potential to persist for some time, even after isolation measures are eased [27]. Participants from the nutrition & dietetics division adhered best to the healthy eating pattern while participants from the nursing division adhered least well to the Mediterranean diet. It is encouraging to observe that participants from the nutrition & dietetics division, those who are (or have been) trained to become expert dietitians, showed the highest median mMDS. This indicates that they are adhering to a healthy eating pattern even under strict confinement conditions.

In this sample 96.3%, 97.4% and 99.1% of the volunteers reported being abstinent or not drinking more than one unit of wine, beer or liquor/spirits daily during the preceding seven days. They adhere to the guidelines of the Swiss Federal Commission on Alcohol Issues for healthy adult females [28]. Following those Swiss guidelines, healthy adult males would be allowed to drink two units of alcoholic beverages daily. Alcohol consumption was evenly distributed across the participants of the different health profession divisions and between student study levels and employees' groups. The prevalence of moderate/high risk

alcohol drinkers in this study was much lower than the German study of Keller et al. [24] who reported 65% binge drinking in first year university students. It is encouraging to observe the high prevalence of alcohol abstinence and healthy alcohol consumption habits in participants of the different health profession divisions of BFH-DHP, even under strict confinement conditions. However, on the individual level, 68 out of the 815 volunteers included in the alcohol consumption analysis reported daily alcohol intake of more than one unit while 0.9% reported drink combinations of types of alcohol with more than three units per day. These participants do not adhere to the Swiss healthy alcohol drinking guidelines for adult females [28]. It is impossible to check if the same two persons who reported a daily alcohol intake of more than seven units of three types of alcohol are binge drinkers or simply reported their true consumption inaccurately.

Results of this study on nutritional habits and alcohol consumption may have important public health implications. When preparing health promotion campaigns to improve adherence to a more healthy eating pattern, the leaders of universities with different health profession divisions should primarily focus on those students and employees who are not enrolled at the division of nutrition & dietetics to empower them to practice healthier eating patterns especially during a confinement period. This could be achieved by implementing a module on healthy eating habits in the curriculum of the divisions of midwifery, nursing and physiotherapy. Furthermore, the team for workplace health promotion of such universities might plan such a module specifically for employees. Measures should be installed to detect the small group of students and employees with low to very low adherence to mMDS and to increase their health literacy on the negative effects of an unhealthy eating pattern. Health promotion campaigns to strengthen the observed healthy attitude towards alcohol consumption in the majority of participants should focus on all students and employees, while measures should be put in place to detect the small group of students and employees with unhealthy drinking behavior to increase their health literacy on the negative health and social effects of alcohol abuse, especially during such a confinement period.

During the confinement period and during the seven days that preceded participation in this survey, the prevalence of bad sleeping quality or sleeping quality that could be improved was 44.7%. This is consistent with a study of Salehinejad et al. [29] that showed that participants reported significantly poorer sleep quality in home quarantine during the

COVID-19 crisis compared to the pre-quarantine time. For sleeping quality, no group differences between the participants of the different health profession divisions or between the students' levels and employees were found. The median sleeping duration in this sample was eight hours, which represents adherence to healthy sleeping guidelines [30]. Again, no group differences were observed. Prevalence of short sleep duration, defined as less than seven hours of sleep in a 24 hour period [31], was 5.5%. This number is low compared to the prevalence of short sleep duration of 57.8% observed in 52,256 middle and high school students in the US [32]. There is evidence that short sleep duration is associated with risk factors such as obesity, diabetes, mental health and poor academic performance [32].

The observed later median wake-up time in the BSc students as compared to the MSc student group and the employee group could, at least partially, be explained by the fact that most BSc programs are full time while most MSc programs at BFH-DHP are part time, allowing MSc students to go to work.

Limitations

This study was conducted in a highly specific sample of members of the four divisions of different health professions at BFH-DHP, in Switzerland. Generalizability to other universities or faculties may be hampered. Furthermore, the present study evaluated the prevalence of risk factors in this population of university students and employees during the confinement period only. Therefore, a comparison with the pre-confinement period cannot be made. To keep the questionnaire short and to guarantee anonymity, other important risk factors (e.g. smoking status, stress status) as well as demographic data (e.g. age, sex, living situation) or socio-economic status data were omitted, making it impossible to correct for potential confounding factors. Socio-economic status is indeed an important risk factor. Gallo et al. [27] found that university students who had at least one graduate parent were more likely to achieve recommended levels of PA even during the lockdown as compared to their peers who had no graduate parent [10]. In self-reported surveys, a social desirability bias cannot be excluded. This is a special type of response bias describing a tendency of survey respondents to answer questions in a manner that will be viewed favorably by others and may lead to underreporting of unhealthy and overreporting of healthy lifestyle habits [33]. This bias makes comparisons and interpretation of average tendencies difficult and has been well described in students of nutrition & dietetics [34]. It

can be assumed that the issue of social desirability bias applies also for students and employees of other health professions. Another limitation of the present study may be the lack of information about the current health status of the participants. Acute illness around the time of the survey may have interfered with usual PA levels, or nutritional and sleeping habits. Finally, a recently published meta-analysis on the validity of iPAQ-SF concluded that there is but weak evidence to support iPAQ-SF for the measurement of absolute or relative PA, yet only one of the 23 included studies compared iPAQ-SF with the doubly labeled water technique as “criterion gold-standard” [35].

Conclusion

This survey described PA, sitting time, nutritional and alcohol consumption habits and sleeping behavior of students and employees of a university of applied sciences during the 2020 COVID-19 confinement in Switzerland.

Results of this survey may help to make leaders of universities aware of the burden and the clustering of unhealthy lifestyle habits in students and employees during such a confinement period. Action plans are needed for health promotion campaigns for students and employees to be better prepared if a similar confinement period is imposed in future. The findings of this study allow group-specific recommendations to be made: health promotion campaigns to increase PA and reduce physical inactivity should focus on students and employees, especially those in the nutrition & dietetics division, while healthy eating campaigns should primarily focus on those students and employees who are not enrolled at the division of nutrition & dietetics to empower them to practice healthier eating patterns especially during a confinement period.

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Availability of data and material:

The dataset used during the current study is available from the corresponding author on reasonable request.

Ethics declarations

Ethical approval

KEK Bern, Req-2020-00909

Competing interest

The authors declare that they have no competing interests

Consent of publication: Not applicable.

Authors' contributions

JT had the idea and was project manager of this study; HB is the principal investigator of the research group; SR, JT, KH, EL and HB designed the study protocol. SR and EL performed data collection, JT conducted the analyses and drafted the manuscript. SR, EL, JT, KH and HB, further edited the manuscript and all gave final approval.

Abbreviations

BFH-DHP	Bern University of Applied Sciences, Department of Health Professions
iAPQ-SF	International Physical Activity Questionnaire Short Form
mMDS	Median modified Mediterranean Diet Score
PA	physical activity

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Legend

Table 1: Absolute and relative frequencies of the categorized PA data (of the preceding 7 days) of 650 students and employees of BFH-DHP during COVID-19 lockdown per health profession division and per student level and for the employees' group.

Table 2: Absolute and relative frequencies of the different types of alcohol consumption (over the preceding seven days) of 815 students and employees of a Swiss university of applied sciences during COVID-19 lockdown from March to May 2020.

Fig. 1: E_D = Nutrition & Dietetics; HEB = Midwifery; PFL = Nursing; PHY = Physiotherapy in 650 students and employees of BFH-DHP during COVID-19 lockdown.

Figure 2: Boxplots of the summed MET-min.week^{-1} scores per group of student level (BSc and MSc) and the employees' group (EMP) in 650 students and employees of BFH-DHP during COVID-19 lockdown.

Figure 3 (left): Boxplots of the daily sitting times (in minutes) per health profession division (E_D = Nutrition & Dietetics; HEB = Midwifery; PFL = Nursing; PHY = Physiotherapy) in 761 students and employees of BFH-DHP during COVID-19 lockdown. (right): Boxplots of the daily sitting time (in minutes) per group of student level (BSc and MSc) and the employees' group (=EMP) in 721 students and employees of BFH-DHP during COVID-19 lockdown.

Figure 4: Boxplots of the mMDS per health profession division (E_D = Nutrition & Dietetics; HEB = Midwifery; PFL = Nursing; PHY = Physiotherapy) in 771 students and employees of BFH-DHP during COVID-19 lockdown.

Figure 5. Boxplot of wake-up time per group of student level (BSc and MSc) and the employees' group (=EMP) in 796 students and employees of BFH-DHP during COVID-19 lockdown.

Supplementary Files

Table 2.
URL: https://asset.jmir.pub/assets/791126c7fb2ee0436d5ec2465b6c80fe.docx

Table 1.
URL: https://asset.jmir.pub/assets/d4c7f7c3088ef78ff83cc7d3092ee860.docx

Untitled.
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Supplementary file Table 1.
URL: https://asset.jmir.pub/assets/9384d879733a7dd745e2774aae1e7b6f.docx

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Figures

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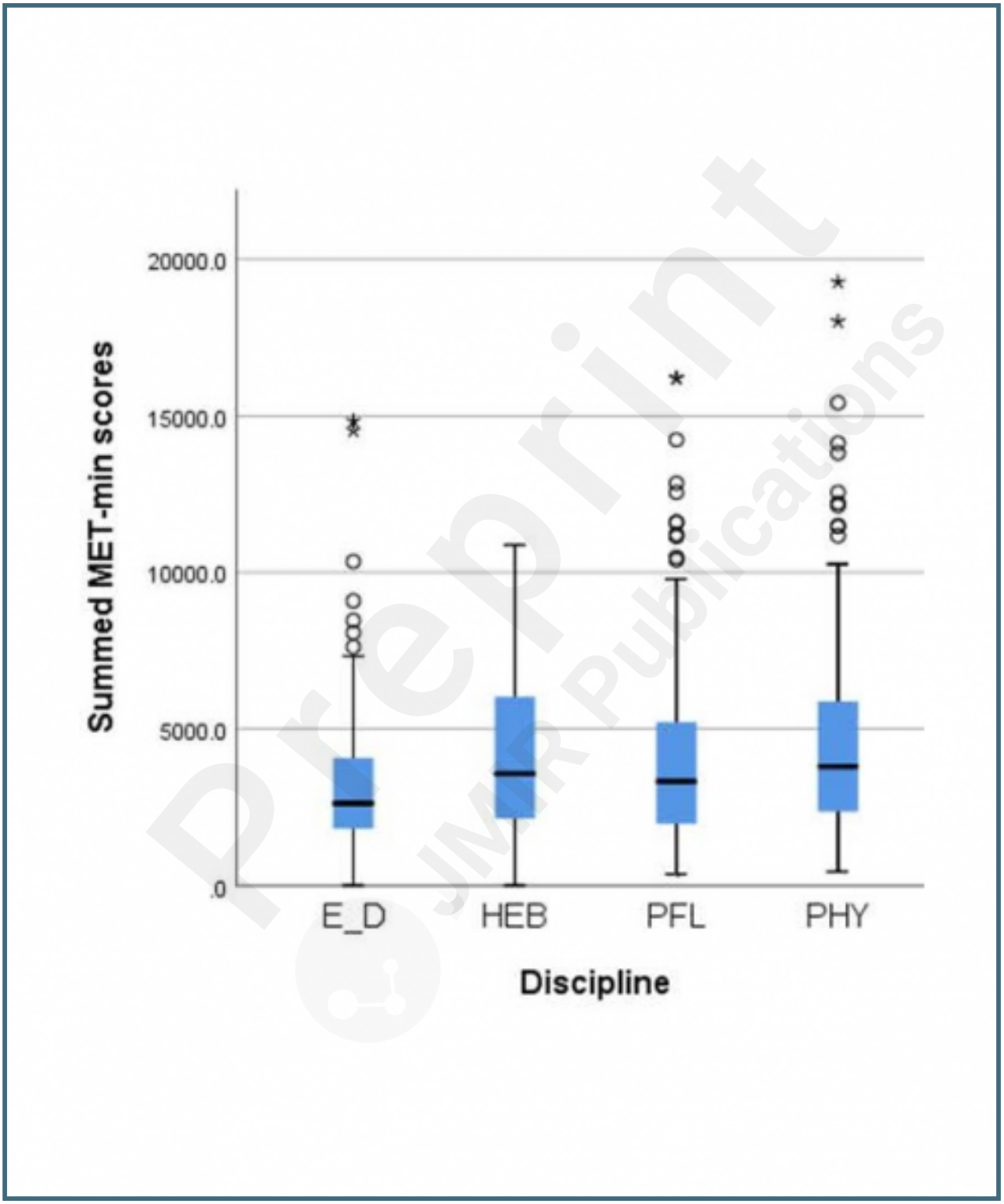
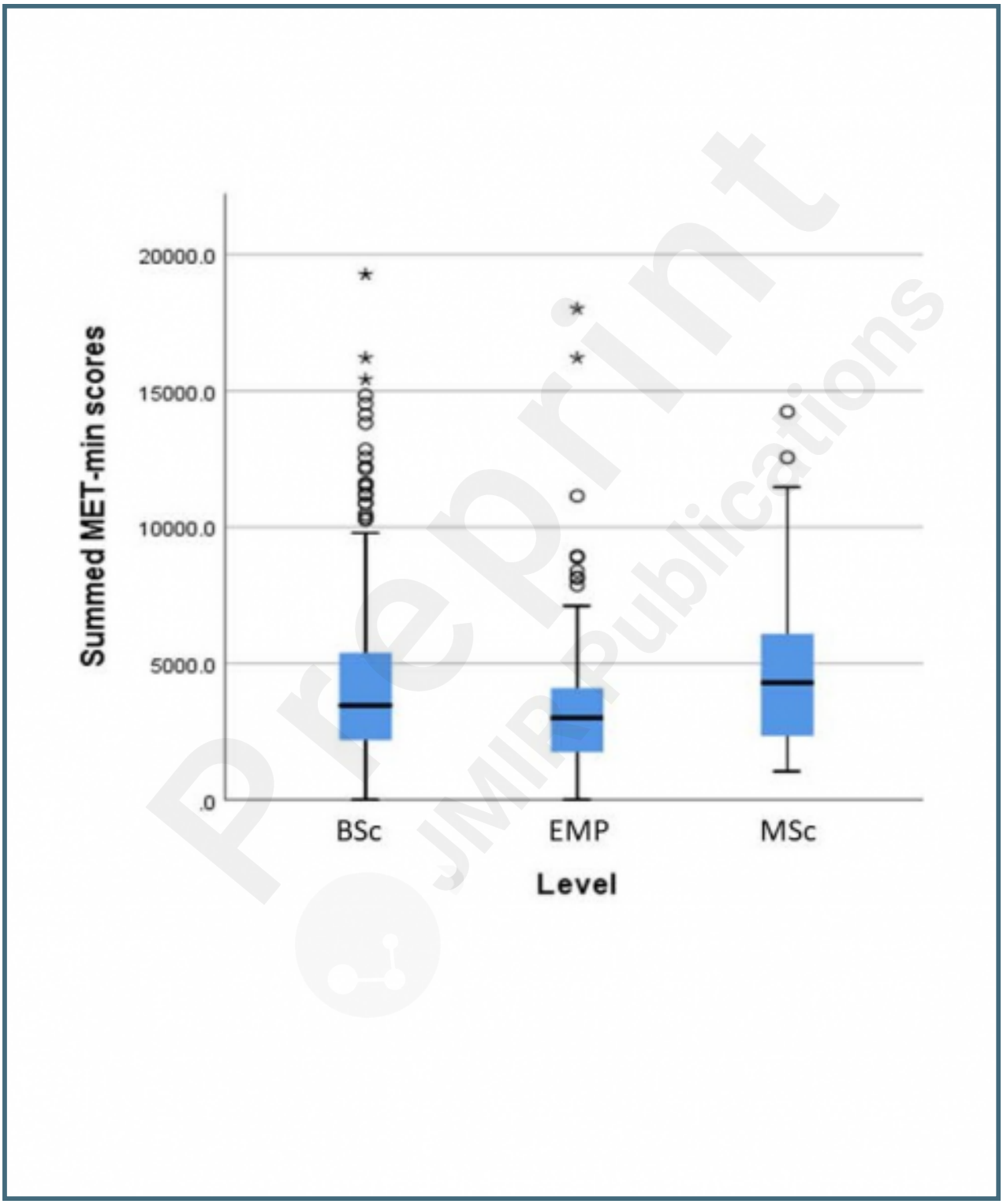
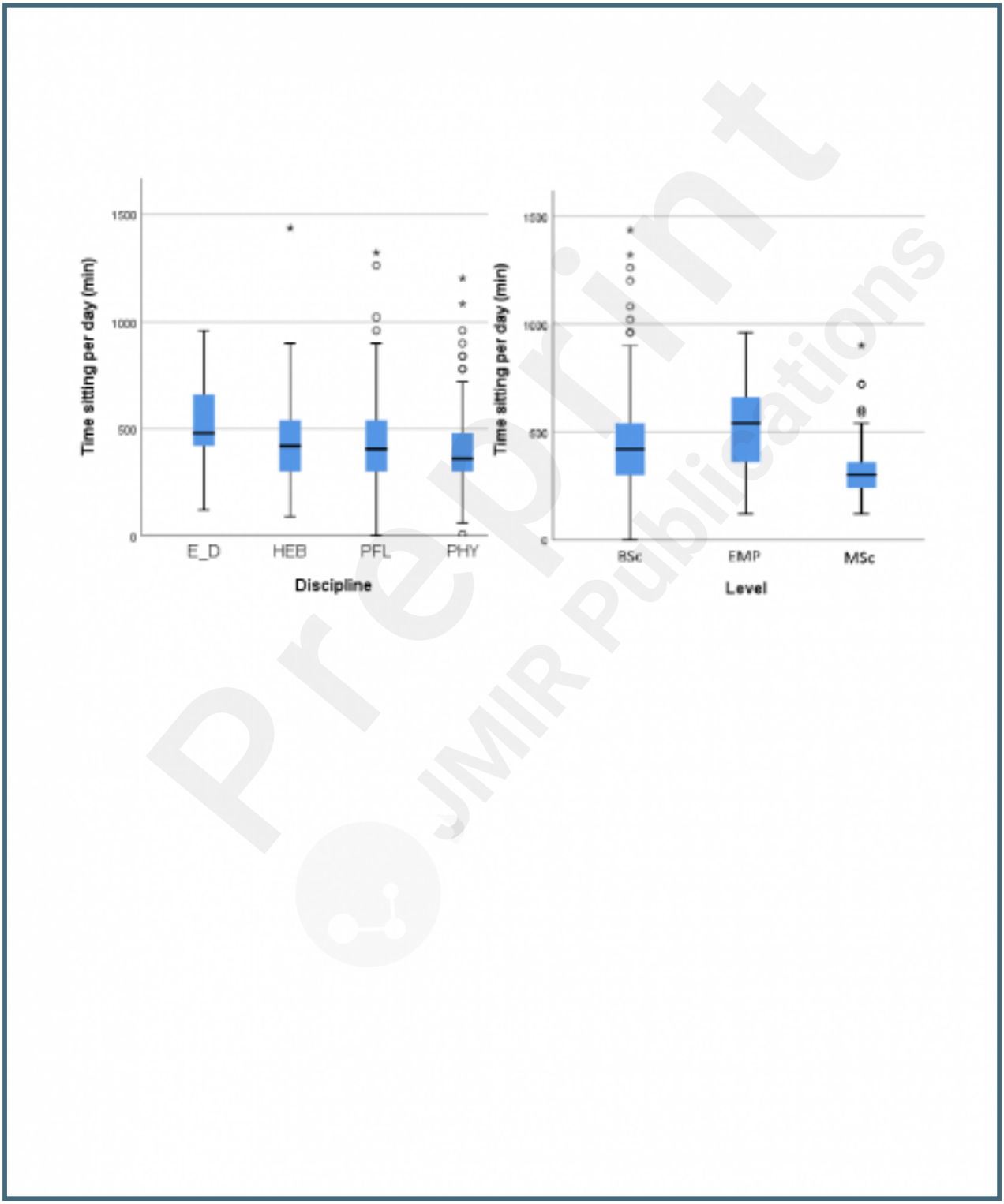
Boxplots of the physical activity scores (summed MET-min.week-1) per health profession division of a Swiss university of applied sciences (health professions) during the spring 2020 COVID-19 lockdown Legend: E_D = Nutrition & Dietetics; HEB = Midwifery; PFL = Nursing; PHY = Whiskers indicate [1.5 x Inter Quartile Range] unless truncated at lowest score.



Boxplots of the physical activity scores (summed MET-min.week-1) per group of student level and the employees' group in 650 students and employees of a Swiss university of applied sciences (health professions) during the spring 2020 COVID-19 lockdown. Legend: BSc and MSc = student level; EMP = employees Whiskers indicate [1.5 x Inter Quartile Range] unless truncated at lowest score.



(left): Boxplots of the daily sitting times (in minutes) per health profession division in 761 students and employees of a Swiss university of applied sciences during the spring 2020 COVID-19 lockdown. (right): Boxplots of the daily sitting time (in minutes) per group of student level and the employees' group in 721 students and employees. Legend: E_D = Nutrition & Dietetics; HEB = Midwifery; PFL = Nursing; PHY = Physiotherapy; BSc and MSc = students' level; EMP = employees. Whiskers indicate [1.5 x Inter Quartile Range] unless truncated at lowest score.



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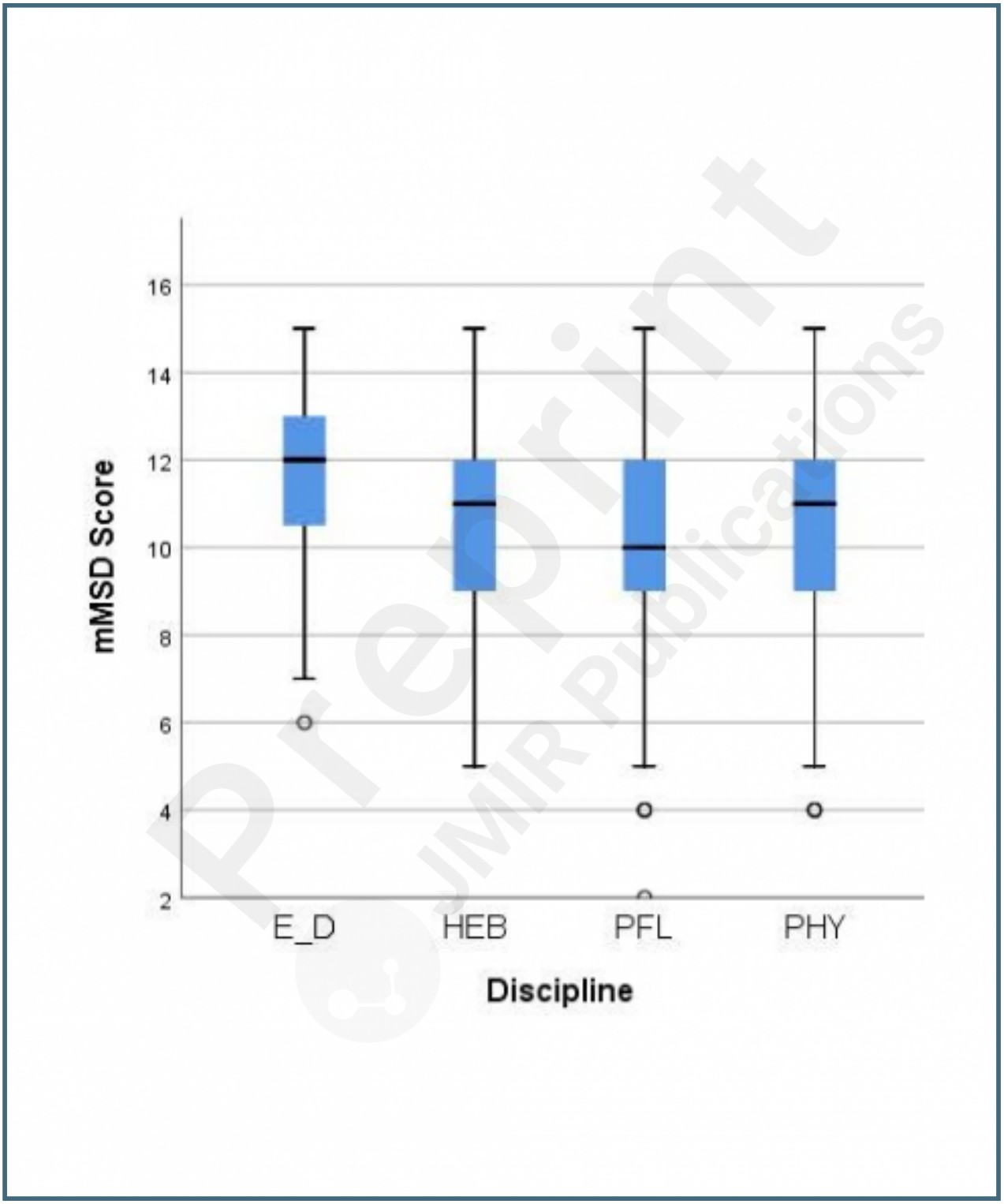
Boxplots of the eating habits (mMDS) per health profession division in 771 students and employees of a Swiss university of applied sciences during the spring 2020 COVID-19 lockdown. Legend: E_D = Nutrition & Dietetics; HEB = Midwifery; PFL = Nursing; PHY = Physiotherapy. Whiskers indicate [1.5 x Inter Quartile Range] unless truncated at lowest score.



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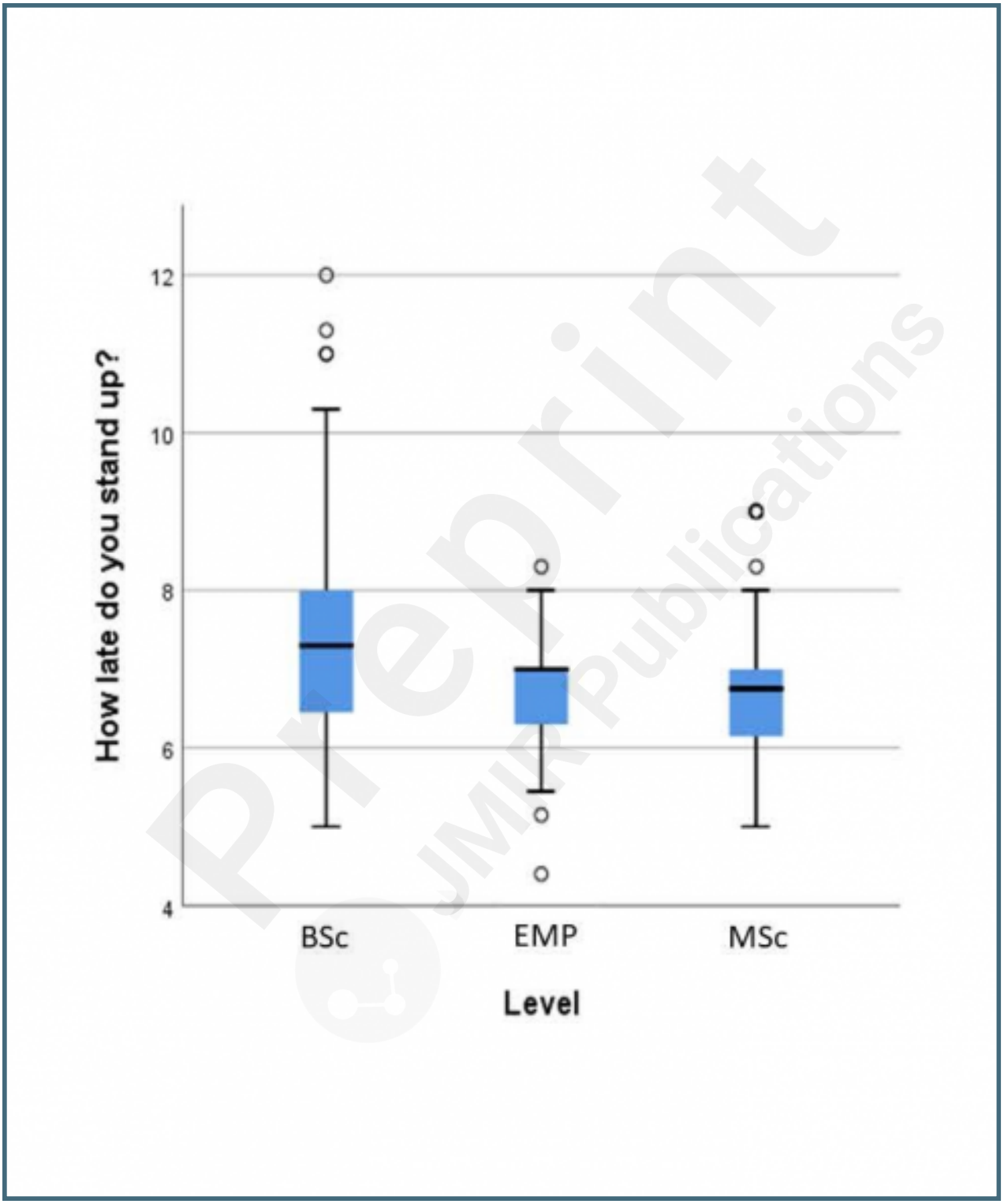
Boxplot of wake-up time per group of student level and the employees' group in 796 students and employees of a Swiss university of applied sciences (health professions) during the spring 2020 COVID-19 lockdown. Legend: BSc and MSc = students' level; EMP = employees.



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