

Physical Health Problems and Patterns of Self-Care Associated with the Use of Digital Devices among University Students

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ABSTRACT

INTRODUCTION: Utilization of digital devices create some problems for users, such as, mental disorder, visual problems, headache, weight gain and unnecessary time consumption. Therefore, this study aims to identify the information about the practices on the use of digital devices, its impact on physical health and pattern of self-care among the university students involved in different professions. **MATERIALS AND METHODS:** MPhil scholars involved in different professions (n= 315) of Nepal Open University (NOU) had participated in this cross-sectional online survey during January 2019 to August 2019. Multivariable analysis was employed to obtain rate ratios and chi-square test was used for the association of the use of digital devices with physical health problems. **RESULTS:** Socio-demographic factors like age was significantly associated with neck pain (p=0.02) and stiffness in hands/arms (p=0.04), while profession was associated with weight gain and difficulty in sleep (p=0.04). Moreover, the use of tablets or taking tea or coffee during the use of digital devices was associated with headache among university students (p=0.05) with small effect sizes. Additionally, we found that headache (p< 0.001), and weight gain (p= 0.01) were significantly associated with the daily use of computer and TV respectively. **CONCLUSIONS:** Physical health problems among the subjects who used computers and TV were relatively high as compared to the subjects who used laptops. Self-care measures taken by participants for physical health problems involved the use of medicine and meditation.

Keywords: Digital devices, physical health, self-care.

INTRODUCTION

Various studies have revealed that there has been a massive increase in the use of digital devices like computer, mobile phone, laptop, and television (TV) among university students across the globe [1-4]. Digital tools and devices are being integrated with almost all human activities such as office, classroom, training, seminar, workshop, medicine and social awareness program demanding the implementation of digital literacy in modern education, health, business and other related activities. Digital technologies have several benefits such as keeping medical records [5], learning for disabled [6] and academic performance [7]. The use of digital technology has a significant adverse impact on personal health [8] and physical health [9]. It is more convenient for medical care [10-12]

and well-being [13], weight loss [14], and endorsement of healthy behaviour [15]. Hoque, (2018) showed that using digital resources has significant effects on youth's lifestyle. The proper use of digital resources can be adopted to improve our health conditions like improving diet plans, tracking fitness efforts and diagnosing medical compliances [17]. Hence, this study was conducted to assess the effect of digital devices on physical health problems and assess the patterns of self-care behaviours among university students.

Utilization of digital tools and devices creates some problems for users, for example, visual problems [18-19], headache [20-21], unnecessary time consumption [22], and weight gain [23]. Nevertheless, individuals use several self-

prevention measures to prevent and control such problems [19] for living a healthy life [24] and personal welfare. Healthy eating habits, sleep regularity, engagement in activity/hobbies, exercise, medical care and rest are the major self-care activities for physical health [25]. Also, MacKichan et al. (2011) mentioned that exercise, meditation, positive thinking, sleep, heat, vitamins, rest, gathering family/friends, spending time alone, prayer, proper diet, drinking, hobbies and support from the group are self-care practices. By supporting these references, preventive measures for physical health problems were medicine, meditation and taking rest. The overall ICT development of Nepal is not considered satisfactory as the country still lacks minimum ICT infrastructure throughout the country. Nepal comprises of 66.21% access to the internet with ICT global ranking of 139th among 175 and ICT development index 2.88 [26]. The current study focuses precisely on the use of digital devices viz. television, computer and laptop, and their consequences on various health indicators and association between health problems and their self-care pattern among academic and non-academic participants of the university. The information obtained from the study relates the personal health issues with self-care techniques, which is highly beneficial for all digital resource users including other stakeholders for their health care awareness while using digital resources.

MATERIALS AND METHODS

Study design and setting

A cross-sectional study was conducted through an online survey questionnaire. This study was conducted at Nepal Open University (NOU), Nepal. NOU is the first open university of Nepal established in 2016. There are three faculties namely (i) Faculty of Science, Health and Technology, (ii) Faculty of Social Science and Education, and (iii) Faculty of Management and Law. MPhil programs are being run in two faculties- Faculty of Science, Health and Technology and Faculty of Social Science and Education. All the participants were selected from these two faculties. All the participants were engaged in different professions like teaching, government and private job while

studying at NOU for pursuing MPhil degree through distance education and online classes.

Sample size and sampling

The sample size for the study was calculated through the online calculator “select statistical services” for the finite population. We assumed $p = 50\%$ as no prior research was conducted in the country. After substituting the values, sample size determined was found to be 212. By allowing 20% non-response, the final sample size obtained was 255 which was sufficient for this study [27]. We approached all participants, i.e. 469 MPhil scholars from the Faculty of Social Science and Education and Faculty of Science, Health and Technology of NOU. However, 315 had returned the filled-up questionnaire, and the response rate was 67.16%.

Data collection

The data was collected from Jan. 2019 to Aug. 2019 through a semi-structured questionnaire created in Google Form. Email addresses and contact details of all scholars were obtained from the university’s respective faculties, and the Google form was sent to the e-mail addresses of all scholars. They were requested to fill the form and to return it to the researcher. Reminder to fill up the form was sent through email and by telephone calls to all participants after one and half months. Ethical approval was obtained from the Ethical Review Board of Janaki Medical College.

Study variables and its measurement

The outcome variables for physical health problems were headache, neck pain, back pain, eye strain, strain on hands and arms, sleep difficulties, passiveness of body and weight gain. The responses for each physical problem were recorded as “yes” or “no”. Additionally, self-reported treatment by the respondents having physical problems were recorded as (i) use medicine, (ii) meditation, (iii) taking rest, and (iv) no treatment.

Independent variables used in this study were age, gender, profession and job experience of the respondents. Age was categorized in two groups as 20-40 years and 41-60 years, gender as male and female, profession classified as teaching (teachers in schools and lecturer, assistant professor and associate professors in college) and non-teaching (working in government sectors, NGOs and INGOs). Job experience was categorized into two

categories; ≤ 10 years and > 10 years. Use of medicine (tablets) or tea or coffee was also recorded as reported by the respondents during digital device use.

Statistical considerations

Descriptive and inferential statistical techniques were employed for data analysis. Frequency and percentage were calculated under descriptive statistics, whereas the chi-square test was carried out under inferential statistics for the significant association of daily use of digital devices with physical health problems. Rate ratios were calculated and adjusted for potential confounders. The p -value ≤ 0.05 was considered to be statistically significant. All data were analyzed by using Statistical Package for Social Science (SPSS version 23 for Windows).

RESULTS

Socio-demographic characteristics with daily use of digital devices

Table 1 shows the socio-demographic information and the use of digital devices among the respondents. In all the digital devices, the numbers of laptop users were higher (90.16%) as compared to TV (56.83%) and computer (31.43%) on a daily basis. The proportion of daily laptop users was high across all the respondents socio-demographic characteristics ranging from 86.09% to 96.59% except females (79.07%). Around half of the respondents were engaged daily in watching TV; however, it was slightly higher among the participants involved in the teaching profession (61.60%) and those who took tablets or coffee or tea during watching TV (61.21%). In regard to daily use of computer, around one-third of the respondents used computer daily, with its use higher among non-teaching professionals 42.17%.

Association of physical health problems with the socio-demographic characteristics

Table 2 reveals all the physical health problems considered for this study which was higher in female than the male counterparts. Further, eye strain, neck pain and weight gain were

Table 1 Socio-demographic characteristics and the use of digital devices among university students (n=315)

Socio-demographic characteristics	Daily use of digital devices			Total
	TV	Computer	Laptop	
Age (years)				
20-40	127(55.95)	70(30.83)	199(87.67)	227(72.1)
41-60	52(59.09)	29(32.95)	85(96.59)	88(27.9)
Gender				
Male	155(56.99)	87(31.99)	250(91.91)	272(86.3)
Female	24(55.81)	12(27.91)	34(79.07)	43(13.7)
Profession				
Teaching	142(61.21)	64(27.59)	211(90.95)	232(73.7)
Non-teaching	37(44.58)	35(42.17)	73(87.95)	83(26.3)
Job Experience*				
≤ 10 years	87(57.62)	46(30.46)	130 (86.09)	151(47.9)
> 10 years	86(58.50)	48(32.65)	139 (94.56)	147(46.7)
Take tablets/ drink coffee or tea				
Yes	77(61.60)	47(37.6)	113(90.4)	125(39.7)
No	102(53.68)	51(26.84)	171(90.00)	190(60.3)
Total	179(56.83)	99(31.43)	284(90.16)	315(100)

*Missing value 17

higher among respondents aged 41-60 years, whereas headache, back pain, strain on hands and arms, sleep difficulties, and body's passiveness were higher among respondents aged 20-40 years. A significant association was found across socio-demographic characteristics and physical health problems like age group with neck pain ($\chi^2 = 5.081$, $p = 0.02$, $\Phi = -0.13$) and strain in hands/arms ($\chi^2 = 4.46$, $p = 0.04$, $\Phi = 0.13$), profession with weight gain ($\chi^2 = 4.2$, $p = 0.04$, $\Phi = -0.12$). In context to the profession, all types of physical health problems were higher among participants engaged in teaching profession however, weight gain was higher among participants who were involved in non-teaching profession ($\chi^2 = 4.19$, $p = 0.04$, $\Phi = 0.13$). Likewise, sleep difficulty was greater among participants with work experience of less than ten years ($\chi^2 = 4.19$, $p = 0.04$, $\Phi = 0.13$). However, weight gain was higher among participants with work experience of more than ten years ($\chi^2 = 4.57$, $p = 0.03$, $\Phi = -0.13$). Moreover, the proportion of respondents with headache was higher among those who took tablets

or coffee or tea while using digital devices ($\chi^2 = 3.98$, $p = 0.05$, $\Phi = 0.12$) with small effect size [28, p. 220].

Table 2 | Association of physical health problems with socio-demographic characteristics (n=315)

Socio-demographic Characteristics	Headache		Eye Strain		Back Pain		Neck Pain		Strain in Hands/Arms		Sleep Difficulty		Passiveness of Body		Weight Gain		
	Yes	p-value	Yes	p-value	Yes	p-value	Yes	p-value	Yes	p-value	Yes	p-value	Yes	p-value	Yes	p-value	
Age (years)																	
20-40	51.98	0.07	50.66	0.99	58.15	0.6	41.41	0.02*	49.78	0.04*	28.19	0.23	47.58	0.47	25.11	0.33	
41-60	39.77		67.05		57.95		52.27		34.09		20.45		39.77		28.41		
Gender																	
Male	47.43	0.32	66.91	0.27	56.25	0.11	43.38	0.45	44.49	0.47	25	0.31	45.59	0.77	32.35	0.39	
Female	55.81		74.42		69.77		51.16		51.16		32.56		46.19		32.56		
Profession																	
Teaching	50.0	0.42	69.83	0.23	58.19	0.96	45.26	0.66	46.55	0.53	27.16	0.45	42.67	0.06	23.28	0.04*	
Non-teaching	44.58		62.65		50.6		42.17		42.17		22.89		53.01		33.73		
Experience																	
≤10 years	50.33	0.87	70.86	0.8	55.63	0.11	39.74	0.68	47.68	0.78	32.45	0.04*	47.02	0.62	21.19	0.03*	
>10 years	48.98		65.99		61.22		47.62		43.53		21.09		41.5		30.61		
Tablets/drink																	
Yes	55.2	0.05*	70.4	0.45	61.6	0.21	48.8	0.22	49.6	0.19	27.2	0.64	50.4	0.14	29.6	0.15	
No	44.21		66.31		55.79		41.58		42.63		25.26		42.11		23.68		

Table 3 | Self-reported physical health problems associated with the use of digital devices among university students (n=315)

Physical health problems	Response	Daily use of digital devices (yes, %)			Total
		TV (n=179)	Computer n=99	Laptop (n=284)	
Headache	Yes	95 (56.2)	64(68.1)*	138(51.1)	153 (48.6)
Neck pain	Yes	81(50.9)	47(54.0)	130(51.0)	140 (44.4)
Back pain	Yes	102(63.0)	56(63.6)	164(63.6)	183 (58.1)
Eye strain	Yes	120(71.4)	66(73.3)	194(73.5)	214 (67.9)
Strain on hands & arms	Yes	74(46.8)	42(48.3)	127(50.4)	143 (45.4)
Sleep difficulties	Yes	42(26.4)	27(30.3)	74(29.1)	82 (26.0)
Passiveness of body	Yes	80(50.6)	46(52.9)	127(50.4)	143 (45.4)
Weight gain	Yes	40(24.7)*	30(33.0)	72(27.8)	82 (26.0)

*p-value <0.05 (i.e. Significant)

Association of physical health problems with the daily use of digital devices among university students

Table 3 highlights the effect of daily use of digital devices with specific health problems. It showed that more than half (58.1%) of the participants were affected with back pain, and around two-third (67.9%) had eye problems. More than one-fourth (26%) of them had weight gain and sleep difficulty (26%). Around half of the respondents had problems of headache (48.6%), neck pain (44.4%), strain on hands and arms (45.4%) and passiveness of body (45.4%). This comparison showed that headache, back pain and eye strain were major health risks caused by daily use of digital devices whereas weight gain and sleep difficulty were minor health problems. In case of visual problems, around three-fourth of the users of digital device viz. TV (71.4%), computer (73.3%) and laptop (73.5%) had eye strain problem. Around two-thirds of the digital device user viz. TV (63%), computer (73.3%) and laptop (63.6%) had back pain. However, the proportion was lower compared to sleep difficulty and weight gain. Thus, eye strain, back pain and headache were found to be major health problems as they contributed to around/more than 50% of total digital device users. Moreover, the chi-square test for independence sample indicated the significant association between daily use of computer and headache ($\chi^2= 18.47$, $p= 0.00$, $\Phi=0.25$) with moderate effect size, and daily use of TV ($\chi^2= 10.72$, $p= 0.01$, $\Phi=0.19$) and weight gain with small effect size, contrarily insignificant association

Table 4 | Multivariable analysis of self-reported physical health problems in relation to the use of digital devices among university students

Physical health problems	Daily use of digital devices	Rate Ratio (RR)	95%CI
Headache	TV	1.10	0.85-1.34
	Computer	1.33	1.08-1.58
	Laptop	Ref.	-
Neck pain	TV	1.00	0.76-1.24
	Computer	1.06	0.80-1.32
	Laptop	Ref.	-
Back pain	TV	0.99	0.74-1.24
	Computer	1.00	0.74-1.26
	Laptop	Ref.	-
Eye strain	TV	0.97	0.75-1.20
	Computer	1.00	0.76-1.24
	Laptop	Ref.	-
Strain on hands and arms	TV	0.93	0.69-1.74
	Computer	0.96	0.70-1.22
	Laptop	Ref.	-
Sleep difficulties	TV	0.91	0.63-1.91
	Computer	1.04	0.75-1.33
	Laptop	Ref.	-
Passiveness of the body	TV	1.00	0.76-1.24
	Computer	1.05	0.79-1.31
	Laptop	Ref.	-
Weight gain	TV	0.89	0.61-1.17
	Computer	1.19	0.90-1.48
	Laptop	Ref.	-

between the remaining physical health problems with the daily use of digital devices.

Multivariable analysis of physical health problems with the use of digital devices

Multivariable analysis of self-reported physical health problems has been studied in relation to TV and computer by keeping laptop users as a reference in Table 4. In comparison with laptop, keeping the relative risk ratio for TV and computer towards physical health problems for 95 % CI limit are 1.10 (0.85 -1.34) and 1.33 (1.08-1.58) for headache, 1.00 (0.76-1.24) and 1.06 (0.80-1.32) for neck pain, 0.99 (0.74-1.24) and 1.00 (0.74-1.26) for back pain, 0.97 (0.75-1.20) and 1.00 (0.76-1.24) for eye strain, 0.93 (0.69-1.74) and 0.96 (0.70-1.22) for strain on hands and arms, 0.91 (0.63-1.91) and 1.04 (0.75-1.33) for sleep difficulties, 1.00 (0.76-1.24) and 1.05 (0.79-1.31) for passiveness of body & 0.89 (0.61-1.17) and 1.19 (0.90-1.48) for weight gain respectively.

Patterns of treatment having a physical health problem among university students

Table 5 shows the pattern of treatments for different physical health problems among university students. Majority of the participants

Table 5 | Pattern of treatment having physical health problems among university students (n=315)

Physical Health Problems	Using medicine	Meditations	Taking rest	No treatment
	N (%)	N (%)	N (%)	N (%)
Headache	15 (9.8)	26 (17)	83 (54.2)	29 (19)
Neck pain	18 (12.9)	6 (4.3)	75 (53.6)	41 (29.3)
Back pain	22 (12.0)	12 (6.6)	102 (55.7)	47 (25.7)
Eye strain	19 (8.9)	41(19.2)	105 (49.1)	49 (22.9)
Strain on hands/arms	10 (7.0)	6 (4.2)	85 (59.4)	42 (29.4)
Sleep Difficulties	13 (15.9)	4 (4.9)	31 (37.8)	34 (41.4)
Passiveness of body	25 (17.5)	5 (3.5)	50 (35.0)	63 (44.1)
Weight gain	14 (17.1)	3 (3.7)	10 (12.2)	55 (67.1)

took rest when they suffered from headache (54.2 %), neck pain (53.6 %), back pain (55.7 %), strain on hands and arms (59.4 %) and eye strain (49.1 %). Moreover, a higher proportion of participants had no treatment for sleep difficulty, passiveness of body and weight gain. Around one-fourth of the participants either took medicine or did meditation to get rid of physical health problems.

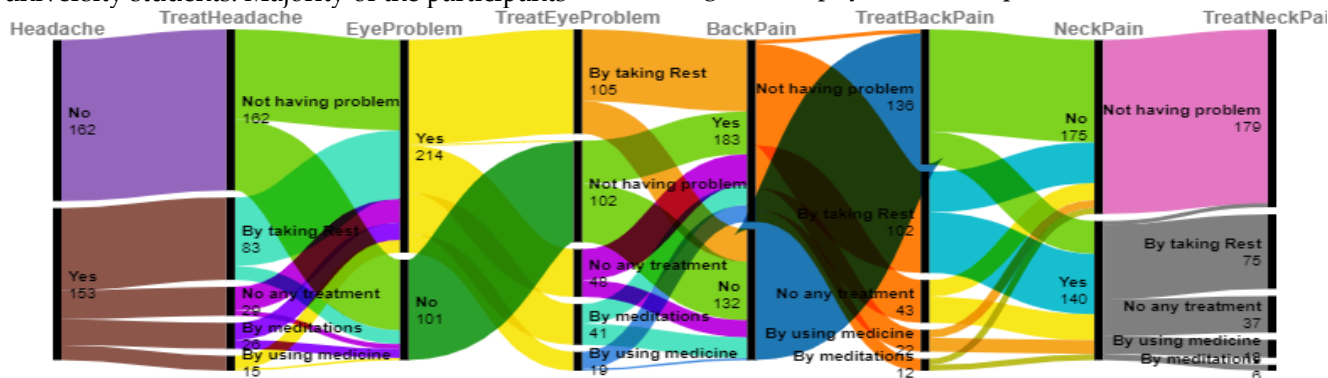


Figure 1 | Visualization of headache, eye problem, back pain, and neck pain and their treatment measures

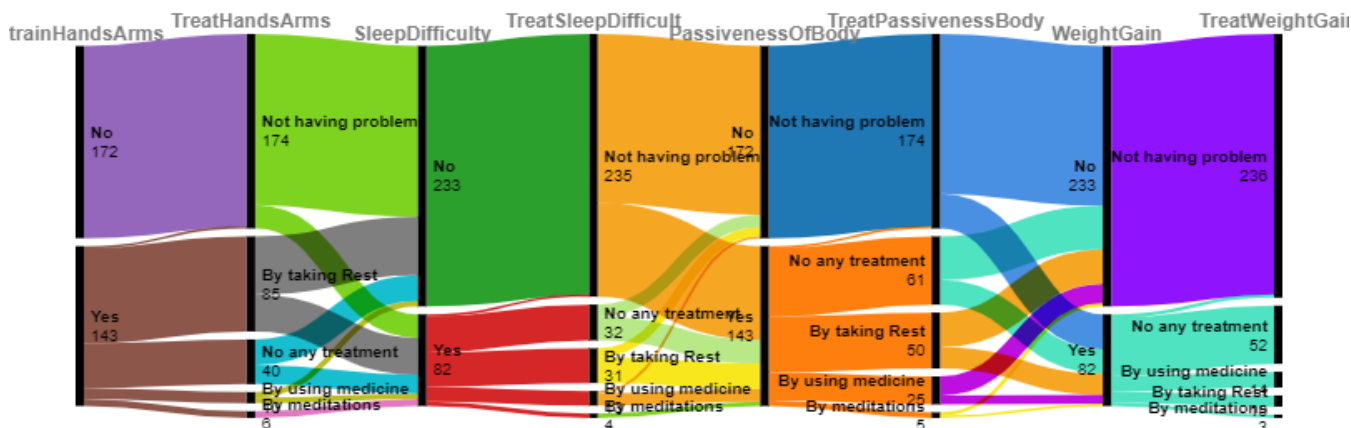


Figure 2 | Visualization of train hands/arms, sleep difficulty, passiveness of body and weight gain, and their treatment measures

DISCUSSION

The current study essentially emphasized the consequences of digital devices use on physical health problems among university students. Regarding socio-demographic characteristics, daily use of the laptop was found higher among male respondents aged 41-60 years, involved in teaching profession with more than ten years of work experience. Similarly, majority of laptop users were taking tablets or coffee or tea during its digital devices use.

Eye strain was high among 41-60 years participants, which is attributed due to high age [29-31] while eye problems were found to be high in those who used computers for more than an hour daily [32]. Among the reported physical health problems, females were more vulnerable than males. This is probably due to the high working time [33] and household responsibilities [34] after office time. A similar finding was found among Nepalese women in physical health [35]. Furthermore, health problems are more common among teaching professionals because they have struggling lives and low income. Socio-demographic factor like age remain significantly associated with neck pain ($p=0.02$), and stiffness in hands/arms ($p=0.04$) and profession is associated with weight gain and difficulty in sleep ($p=0.04$). Moreover, using tablets or taking tea or coffee during the use of digital device was associated with headache among university students ($p=0.05$) with small effect size in each case.

Majority of participants preferred to use laptop daily, followed by computer and TV. Since the university offered all classes by virtual mode, the use of laptop was high as it is portable and easy to carryout in course related activities such as assignments, and the other course materials through Moodle. A similar result suggests that more exposure to technology leads to more physical health problems [36]. The daily use of digital devices had a significant impact on different physical health problems, particularly on headache, neck pain, and back pain among university students. Eye strain and back pain, were common among almost all digital device users. Nevertheless, headache, neck pain, stiffness of hands and arms, and passiveness of body were the significant health problems. The proportion of headache and neck

pain was high among computer users, whereas sleep difficulty and weight gain had a minor effect on the use of digital devices. This finding is similar to the result of other studies on headache [37] and eye problems among 17-30 age group students [20] and on neck pain and headache [38-39].

A significant association was observed for daily use of computer and TV concerning headache and weight gain, respectively, as supported by Cameron et al. [23]. There was also a positive association of digital devices use with physical inactivity and sleep quality, as suggested by Mustafaoglu et al. (2018). Our findings conflict with other studies [19, 40-42] in terms of the pattern of treatment for physical health problems. Our findings also disagree with the use of digital resources in the day time and on the bed with sleep problem [43] and duration of using social media on digital devices with sleep duration [44]. However, our findings were in favour of weight loss [15, 45]. These conflicts might be due to the adolescence participants but our concern was among MPhil scholars only. The proportion of participants taking rest and/or no treatment was high, which showed that most participants were not serious about their health care. Similarly, the proportion of participants seeking no treatment among those issues; sleep difficulties, body passiveness and weight gain problems were comparatively high.

CONCLUSIONS

The findings of this study suggest that, significant proportion of the participants suffered from different types of physical health problems due to the use of digital devices. The relatively higher rate/ratio for headache and weight gain was observed among participants who used television and computer compared to using laptop daily. However, a lower rate/ratio was observed for back pain, eye strain, strain on hands and arm, sleep difficulties and weight gain, among subjects who used television and computer compared to laptops.

The study also found that one-fourth of participants with physical health problems were taking medicines and practicing meditation for self-care. The study indicates, that the use of digital devices is associated with physical health problems. Therefore, health awareness campaigns need to be implemented to improve physical health conditions

of the working students and maintain healthy lives. Although this research is limited to a single university of Nepal, further research can be carried out comprising several universities in the country

with an increased sample size to investigate the impact of use of digital devices on health status and self-care behaviours among university students involving different professions all over the country.

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Data Availability: Data will be available upon request to corresponding authors after valid reason.

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