

Knowledge and Practices of Fourth-Year Medical Students Regarding Caffeinated Drink Consumption: A Cross-Sectional Study



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Abstract

Background: Caffeinated drinks are widely consumed among students for their perceived benefits, such as improved alertness and productivity. However, overconsumption is associated with adverse health effects. This study aimed to assess the knowledge and practices of fourth-year medical students regarding caffeinated drinks and explore associated factors influencing their consumption habits.

Methodology: Employing a convenient sampling technique, 174 fourth-year MBBS students were recruited for the study. A structured questionnaire was used to collect information on students' backgrounds, knowledge, and practices related to caffeinated drinks. Associations between background variables and knowledge/practice were analyzed using the chi-square test, with a significance level of $p \leq 0.05$.

Results: Students demonstrated good knowledge about common caffeinated drinks such as tea (86%), coffee (92%), and carbonated drinks (64%), but 88% were unaware of caffeine in health drinks. Females were more knowledgeable about coffee ($p=0.018$) and caffeinated drink ingredients ($p=0.003$). Students with doctor parents relied on the internet ($p=0.027$) and billboards ($p=0.030$) for information and associated caffeine consumption with improved productivity ($p=0.011$). Boarders consumed more carbonated drinks ($p=0.031$) and reported nausea with increased intake ($p=0.031$), while non-daily consumers experienced headaches ($p=0.001$) and irritation ($p=0.022$).

Conclusion: Despite awareness of adverse effects, medical students continue to consume caffeinated drinks, often associating them with productivity benefits. Targeted health education is needed to address misconceptions and promote balanced consumption.

Keywords: Knowledge; practice; medical students; caffeinated drinks

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Introduction

Nearly everyone needs a boost to start their work, routine and daily activities, for which they take caffeinated drinks. The commencement of a day cannot be imagined without taking a caffeinated drink. The most frequently used drug in the world which changes the mood is caffeine. Naturally caffeine is available in coffee, tea, cola, cocoa and many more products. It produces a stimulant effect creating the boost which is required to start a day (1). Apart from caffeine being present in drinks it is also present in foods like coffee ice cream, coffee yogurt and dark chocolate. So its daily consumption is very common among people (1).

The prevalence of consumption of caffeine was revealed to be 66% in a study conducted among university students both medical and non-medical in the University of Lahore (2). The use of

caffeine plays a significant part in the life of college students whether medical and non-medical. During examinations, assignments and completing tasks as well as deadlines students consume caffeinated drinks, which helps them to fulfil these activities (2). Youngsters including medical and non-medical, all take a liking to indulge in caffeinated drinks, as they conceive that these drinks help in staying awake, keep them energetic and enhance their mental performance. It is also felt that these drinks benefit them while driving and also boost their moods (3).

The know-how about anything at all plays a significant role in its usage. A study conducted in Shanghai, China realized that adolescent students did not have clear understanding about energy and caffeinated drinks. It was also observed in the same study that the parents level of knowledge regarding such drinks was limited, thus affecting the students. Hence awareness about the effects of these drinks is

needed to be given to parents and students through intervention programs (4). Similarly, knowledge deficit about caffeine was also observed in a study in Arizona (5).

Another study highlighted that students were consuming caffeine without awareness of its benefits, complications and withdrawal symptoms (6).

Consequently college students exhibit a preference for consuming energy drinks, which often contain high levels of caffeine. This preference has resulted in increased consumption, often without an understanding of the detrimental effects on health. Many students have reported experiencing adverse symptoms associated with the consumption of these beverages (7).

Consuming large amounts of caffeine has been connected to the development of headaches, increased anxiety and heightened psychological distress (8).

The high frequency of energy drink consumption among students raises significant concerns regarding its potential impact on their health and wellbeing (9).

Medical students must be made aware of energy drinks since they will be responsible for educating the public as healthcare professionals in the future (10).

A systematic review also states that most of the people are not knowledgeable about the caffeine contents in drinks. They desire to drink them as they like the taste and flavor. There is a dire need to mention and label the caffeine content on all of the caffeinated drinks, even in coffee and tea products (11, 12).

The consumption of caffeinated drinks has become a common and favored practice worldwide, especially in the younger population. Mainly it may be due to the expanded advertisement and easy availability. Educational programs regarding the high consumption of caffeinated drinks and their negative health effects need to be acquired (13, 14).

Physical and mental activity is bolstered up by the consumption of caffeinated drinks, which is attracting the younger population to indulge in them. Attractive advertisements and the trend pattern of being a popular or cool personality is also a common reason for engrossing into these drinks. Hence monitoring the intake of such drinks and provision of education about the ill health effects is required to be given. The tolerable amount of caffeinated drinks without causing any ill health needs to be given priority by the food authorities and mass awareness to the public is also necessary to avoid any health issues (15, 16).

It has been acknowledged that feeling energetic, active and being in a good mood when driving is an advantage recognized by younger people influencing them to take caffeinated drinks (17). An increase in consumption of caffeinated drinks is leading to occurrence of many side

effects therefore health education related to ill health effects should be initiated (18). The lack of knowledge about these drinks side effects needs focus, which may be possible by awareness programs and provision of counseling facilities (19, 20).

Scientific evidence recognizes increase consumption and access of caffeinated drinks amongst youngsters, so extended public health awareness about the relevant usage of these drinks is necessary (21, 22, 23). The study was undertaken with a view to assess knowledge and practices of fourth year medical students regarding caffeinated drinks and its consumption. The study also explored the association of gender, residential status and parents (doctor) professional status on knowledge and practices in relation to caffeinated drinks.

Methodology

A Descriptive Cross-Sectional study was conducted at the Department of Community Medicine, Lahore Medical and Dental College (LMDC), Lahore. The duration of the study was three months. A convenient sampling technique was used to select 174 registered students in fourth year MBBS, who agreed to participate in the research.

A structured questionnaire was used as the study tool, to obtain information related to background information like gender, residential status and father and mother's occupation as a doctor, and knowledge and practice of medical students about caffeinated drinks.

Data was entered, cleaned and analysed using Statistical Package for Social Sciences (SPSS), version 24. Data was described in the form of frequencies and percentages and presented as tables and graph. Chi-square test was applied for associations between background variables and knowledge and practice about caffeinated drinks. The cut off point for significance of association was $p \leq 0.05$.

Prior to the study, College Institutional Review Board (IRB) approval was acquired and informed verbal consent was obtained from the study participants, assuring maintenance of confidentiality during data processing and publication of the study results.

Results

Background Information

The study participants comprised of 84(48%) males and 90(52%) females, 95(55%) day scholars and 79(45%) boarders. When asked about the occupation of the parents of study participants, only 12(7%) students had both parent's doctors.

Knowledge about caffeinated drinks

Table 1: Knowledge of fourth year MBBS students about caffeinated drinks (N= 174)

Knowledge about caffeinated drinks	Yes		No	
	N	%	N	%
Types of caffeinated drinks				
Tea	150	86.2	24	13.8
Coffee	160	92.0	14	8.0
Carbonated drinks	111	63.8	63	36.2
Health drinks	21	12.1	153	87.9
Source of information about caffeinated drinks				
Internet	126	72.4	48	27.6
Television	105	60.3	69	39.7
Friends	117	67.2	57	32.5
Bill-boards	53	30.5	121	69.5
Print material	30	17.2	144	82.8
Awareness of the ingredients of caffeinated drinks				
	133	76.4	41	23.6
Caffeine addiction is a health issue in today's society				
	146	83.9	28	16.1
Effects of caffeinated drinks				
Increases Alertness	157	90.2	17	9.8
Elevates mood	135	77.6	39	22.4

Most of the students were knowledgeable about different types of caffeinated drinks like tea (86%), coffee (92%) and carbonated drinks (64%). However, 88% of study participants were unaware about caffeine present in health drinks. Mainly, they obtained information about these drinks from internet source (72%), television (60%) and friends (67%). Students were generally aware about ingredients of caffeinated drinks (76%) and 84% agreed caffeine drinking is an addiction. Students mentioned alertness (90%) and elevated mood (78%) as effects of caffeinated drinks (Table 1).

Practice about caffeinated drinks

Out of 174 students, 159(91%) drank caffeinated drinks, while 15(9%) did not consume such drinks.

Their preferences included tea (72%), coffee (50%) and carbonated drinks (48%). Around 60% of study participants could stay without caffeine for 48-72 hours. Most students consumed caffeinated drinks because they liked the taste (70%) or it increased alertness (66%). Main effects of not consuming caffeinated drinks daily were mentioned as headache (49%), fatigue (43%) and irritation (28%). Increase intake of caffeinated drinks caused nervousness (28%), craving (33%) and nausea (34%) in some students. Around 17% of students needed professional help of health care providers for caffeine related symptoms and 74% of study participants agreed that their caffeine consumption has increased since joining medical university (Table 2).

Table 2: Practice of fourth year MBBS students about caffeinated drinks (N=159)

Practice about caffeinated drinks	Yes		No	
	N	%	N	%
Preferred drink				
Tea	115	72.3	44	27.7
Coffee	79	49.7	80	50.3
Carbonated drinks	76	47.8	83	52.2
Health drinks	4.0	2.5	155	97.5
Staying without caffeine for 48-72 hours	96	60.4	63	39.6
Reasons for consumption of caffeinated drinks				
Like Taste	112	70.4	47	29.6
Gives Energy Boost	94	59.1	65	40.9
Increase Alertness	105	66.0	54	34.0
Improves Productivity	55	34.6	104	65.4
Effect of not consuming caffeinated drinks daily				
Headache	77	48.4	82	51.6
Irritation	45	28.3	114	71.7
Palpitation	12	7.5	147	92.5
Fatigue	69	43.4	90	56.6
Insomnia	17	10.7	142	89.3
Effects increase intake of caffeinated drinks				
Nervousness	45	28.3	114	71.7
Craving	53	33.3	106	66.7
Nausea	54	34.0	105	66.0
Professional consultation needed for symptoms related to caffeinated drinks				
	27	17.0	132	83.0
Increase in caffeine consumption has increased since joining medical university				
	117	73.6	42	26.4

Frequency of daily consumption caffeinated drinks

As seen in Figure 1, majority of the study participants consumed caffeinated drinks twice or thrice a day (72%).

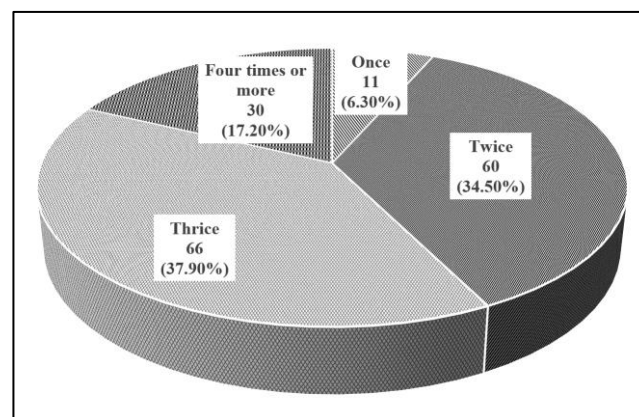


Figure 1: Daily consumption of caffeinated drinks (N=159)

Table 3: Association of gender, residential status and parental profession with knowledge of fourth year MBBS students about caffeinated drinks (N= 174)

Knowledge about caffeinated drinks	Gender			Residential Status			Both Parent Doctors		
	Male (84) n (48.3%)	Female (90) n (51.7%)	p value	Boarder (79) n (45.4%)	Day Scholar (95) n(54.6%)	p value	Yes (12) n (6.9%)	No (162) n (93.1%)	p value
Types of caffeinated drinks									
Tea	72 (85.7)	78 (86.7)	0.856	70 (88.6)	80 (84.2)	0.402	12 (100.0)	138 (85.2)	0.151
Coffee	73 (86.9)	87 (96.7)	0.018	71 (89.9)	89 (93.7)	0.358	12 (100.0)	148 (91.4)	0.288
Carbonated drinks	56 (66.7)	55 (61.1)	0.446	55 (69.6)	56 (58.9)	0.145	10 (83.3)	101 (62.3)	0.144
Health drinks	10 (11.9)	11 (12.2)	0.949	06 (7.6)	15 (15.8)	0.099	02 (16.7)	19 (11.7)	0.612
Source of information about caffeinated drinks									
Internet	63 (75.0)	63 (70.0)	0.461	57 (72.2)	69 (72.6)	0.944	12 (100.0)	114 (70.4)	0.027
Television	53 (63.1)	52 (57.8)	0.474	50 (63.3)	55 (57.9)	0.469	09 (75.0)	96 (59.3)	0.282
Friends	60 (71.4)	57 (63.3)	0.256	57 (72.2)	60 (63.2)	0.208	06 (50.0)	111 (68.5)	0.187
Bill-boards	29 (34.5)	24 (26.7)	0.260	20 (25.3)	33 (34.7)	0.179	07 (58.3)	46 (28.4)	0.030
Print material	16 (19.0)	14 (15.6)	0.542	13 (16.5)	17 (17.9)	0.802	02 (16.7)	28 (17.3)	0.956
Awareness of the ingredients of caffeinated drinks	56 (66.7)	77 (85.6)	0.003	60 (75.9)	73 (76.8)	0.890	10 (83.3)	123 (75.9)	0.560
Caffeine addiction is a health issue in today's society	66 (78.6)	80 (88.9)	0.064	65 (82.3)	81 (85.3)	0.594	11 (91.7)	135 (83.3)	0.448
Effects of caffeinated drinks									
Increases Alertness	76 (90.5)	81 (90.0)	0.916	69 (87.3)	88 (92.6)	0.242	11 (91.7)	146 (90.1)	0.862
Elevates mood	67 (79.8)	68 (75.6)	0.506	60 (75.9)	75 (78.9)	0.637	10 (83.3)	125 (77.2)	0.621

As depicted in Table 3, more females than males had knowledge about coffee ($p=0.018$) and ingredients of caffeinated drinks ($p=0.003$). In comparison with students with non-doctor parents, more students with both parents as doctors received information about caffeinated drinks from internet ($p=0.027$) and bill boards ($p=0.030$).

Table 4: Association of gender, residential status and parental profession with caffeinated drinks consumption among fourth year MBBS students (N= 174)

Consumption of caffeinated drinks	Gender			Residential Status			Both Parent Doctors		
	Male (84) n(48.3%)	Female (90) n(51.7%)	p value	Boarder (79) n(45.4%)	Day Scholar (95) n(54.6%)	p value	Yes (12) n(6.9%)	No (162) n(93.1%)	p value
Preferred drink									
Tea	61 (72.6)	60 (66.7)	0.394	58 (73.4)	63 (66.3)	0.311	06 (50.0)	115 (71.0)	0.127
Coffee	43 (51.2)	40 (44.4)	0.373	35 (44.3)	48 (50.5)	0.413	07 (58.3)	76 (46.9)	0.445
Carbonated drinks	41 (48.8)	36 (40.0)	0.242	42 (53.2)	35 (36.8)	0.031	05 (41.7)	72 (44.4)	0.852
Health drinks	03 (3.6)	01 (1.1)	0.279	03 (3.8)	01 (1.1)	0.229	0 (0.0)	04 (2.5)	0.582
Staying without caffeine for 48-72 hours	60 (71.4)	51 (56.7)	0.043	48 (60.8)	63 (66.3)	0.448	04 (33.3)	107 (66.0)	0.023
Reasons for consumption of caffeinated drinks									
Like Taste	60 (71.4)	57 (63.3)	0.256	56 (70.9)	61 (64.2)	0.350	10 (83.3)	107 (66.0)	0.218

Consumption of caffeinated drinks	Gender			Residential Status			Both Parent Doctors		
	Male (84) n(48.3%)	Female (90) n(51.7%)	p value	Boarder (79) n(45.4%)	Day Scholar (95) n(54.6%)	p value	Yes (12) n(6.9%)	No (162) n(93.1%)	p value
Gives Energy Boost	51 (60.7)	51 (56.7)	0.588	51 (64.6)	51 (53.7)	0.147	09 (75.0)	93 (57.4)	0.232
Increase Alertness	53 (63.1)	55 (61.1)	0.788	48 (60.8)	60 (63.2)	0.745	09 (75.0)	99 (61.1)	0.339
Improves Productivity	31 (36.9)	27 (30.0)	0.334	28 (35.4)	30 (31.6)	0.590	08 (66.7)	50 (30.9)	0.011
Effect of not consuming caffeinated drinks daily									
Headache	39 (46.4)	41 (45.6)	0.908	47 (59.5)	33 (34.7)	0.001	06 (50.0)	74 (45.7)	0.772
Irritation	23 (27.4)	26 (28.9)	0.825	29 (36.7)	20 (21.1)	0.022	04 (33.3)	45 (27.8)	0.680
Palpitation	08 (9.5)	06 (6.7)	0.489	09 (11.4)	05 (5.3)	0.139	01 (8.3)	13 (8.0)	0.970
Fatigue	35 (41.7)	36 (40.0)	0.823	34 (43.0)	37 (38.9)	0.585	06 (50.0)	65 (40.1)	0.502
Insomnia	07 (8.3)	12 (13.3)	0.291	12 (15.2)	07 (7.4)	0.100	01 (8.3)	18 (11.1)	0.766
Effects of increase intake of caffeinated drinks									
Nervousness	23 (27.4)	26 (28.9)	0.825	22 (28.4)	27 (28.4)	0.933	05 (41.7)	44 (27.2)	0.281
Craving	25 (29.8)	32 (35.6)	0.416	29 (36.7)	28 (29.5)	0.311	02 (16.7)	55 (34.0)	0.218
Nausea	31 (36.9)	27 (30.0)	0.334	33 (41.8)	25 (26.3)	0.031	02 (16.7)	56 (34.6)	0.204
Professional consultation needed for symptoms related to caffeinated drinks	18 (21.4)	13 (14.4)	0.229	16 (20.3)	15 (15.8)	0.444	02 (16.7)	29 (17.9)	0.914
Increase in caffeine consumption has increased since joining medical university	54 (64.3)	69 (76.7)	0.073	61 (77.2)	62 (65.3)	0.085	10 (83.3)	113 (69.8)	0.319

As presented in Table 4, boarders consumed more carbonated drinks compared with the day scholars (p=0.031). When staying without caffeine for 48-72 hours, in contrast with females, higher number of males (p=0.043) and those whose parents were non- doctors (p=0.023) could do so. In comparison with students with non-doctor parents, more students with both parents as doctors found that caffeinated drinks improved productivity (p=0.011). If not consuming caffeinated drinks daily, more by boarders than day scholars felt symptoms of headache (p=0.001) and irritation (p=0.022). After increase intake of caffeinated drinks, higher number of boarders compared with day scholars experienced symptoms of nausea (0.031).

Discussion

In today's society consumption of caffeinated drinks is becoming a major trend. The starting of the day cannot be imagined without drinking a caffeinated drink.

The current study focused on knowledge and practices of fourth year medical students regarding caffeinated drinks and explored the association of gender, residential status and parents (doctor) professional status

on knowledge and practices in relation to caffeinated drinks.

In the present study, most of the students were learned about various caffeinated beverages such as tea, coffee and carbonated drinks and their compositions. This aligns with results from studies in Lahore and Benghazi University in Libya. Research indicates that males, when compared to females, exhibit a greater preference for caffeinated drinks (24, 25, 29).

In the present study, most of the students were learned with various caffeinated beverages such as tea, coffee and carbonated drinks. Similar results were seen in a study performed on medical and non-medical students in Lahore, except the most popular drink consumed was soft drinks, followed by tea, coffee and energy drinks (24). Similarly, medical students at Benghazi University Libya also were knowledgeable about these drinks and their contents. It has been observed in studies that males in comparison to females show more inclination towards caffeinated drinks (25, 29). However, in the current study more females than males had knowledge about coffee (p=0.018) and ingredients of caffeinated drinks (p=0.003). Hence depicting awareness and knowledge does not impart

to the habitual usage of caffeinated drinks by medical students.

The study revealed that students with both parents working as doctors were more likely to obtain information about caffeinated drinks from the internet ($p=0.027$) and billboards ($p=0.030$), in contrast to students whose parents were not doctors.

It was disclosed in the study that in comparison with students with non-doctor parents, more students with both parents as doctors received information about caffeinated drinks from internet ($p=0.027$) and billboards ($p=0.030$).

In the study, students agreed (84%) that caffeine addiction was a health issue in today's society. It is evident through scientific research that consumption of caffeinated drinks and caffeine addiction can lead to health concerns. Drinking caffeinated beverages may lead to caffeine dependence. The concerned persons may require treatment for problematic use of caffeine (26, 27).

On the contrary, another study conducted in Lahore, the majority of students did not perceive caffeine as potentially addictive (24).

In contrast in a study in Lahore most students did not think caffeine could be addicting (24).

A difference in opinion regarding being dependent on caffeinated drinks could be seen in different studies within medical students.

The consumption of caffeinated drinks in medical students is alarmingly on the rise apart from having knowledge about its side effects on their health (27). This upsurge of caffeine consumption has been supported in many studies (28-30). However, some studies reveal having little knowledge about side effects of these drinks, still medical students opted for these drinks to create alertness and improve their anxieties within themselves (30-33).

A study realized that coffee is one of the most liked drinks among medical students. (34) Whereas the present study revealed boarders consumed more carbonated drinks compared with the day scholars ($p=0.031$). Caffeinated drinks consumption included liking taste, giving energy boost, increasing alertness and improving productivity, which has been stated in numerous studies (35).

However, the study indicated that when abstaining from coffee for 48-72 hours, a higher proportion of males ($p=0.043$) and individuals whose parents were non-doctors ($p=0.023$), as opposed to females, were capable of doing so. Furthermore, compared to students with non-doctor parents, those with both parents as doctors were more likely to perceive caffeinated drinks as enhancing productivity ($p=0.011$). Moreover, if not consuming caffeinated drinks daily, boarders experienced symptoms of headache ($p=0.001$) and irritation ($p=0.022$) more frequently than day

scholars. Additionally, after increasing their caffeine intake of caffeinated drinks, a higher number of boarders, in comparison to day scholars, reported experiencing symptoms of nausea ($p=0.031$). Consequently, boarder medical students exhibited a higher occurrence of side effects both when abstaining from and increasing their intake of these beverages.

Our study revealed that males and students with non-doctor parents were better able to abstain from coffee for extended periods compared to females and those with doctor parents. Students with doctor parents were more likely to associate caffeinated drinks with improved productivity. Boarders were more prone to experiencing symptoms such as headaches and irritation when not consuming caffeinated drinks daily and were also more likely to report nausea after increased intake compared to day scholars. These findings highlight that boarders experience greater side effects both in the absence of and following increased consumption of caffeinated drinks. There is a need to address and correct misconceptions about caffeinated drinks among medical students.

The different types of caffeinated drinks, their related effects and consumption demonstrate that utilization is alarmingly on surge in medical students, that should be discouraged, and awareness of side effects needs to be emphasized. Students had an increase trend towards consumption of caffeinated drinks apart from knowing related health concerns. The relevant institutions and parents together should discourage increased consumption of caffeinated drinks, must initiate awareness and availability of health drinks of nutritional value in college and hostel canteens and residences.

Our study aims to raise awareness among medical and university students about the adverse effects and growing trends associated with caffeinated drink consumption. It seeks to encourage students to reflect on their habits, make informed choices, and adopt healthier practices. By highlighting these concerns, the study underscores the importance of promoting mindful and balanced consumption while prioritizing healthier beverage options.

Conclusion

The medical students were knowledgeable about adverse effects of caffeinated drinks but still showed a high consumption of these drinks.

Despite their awareness of the adverse effects, medical students still find themselves reaching out for that caffeine fix.

The takeaway is clear: despite understanding the risks, medical students continue to indulge in caffeinated drinks.

Limitation of the study

The study was conducted involving one class of a private sector medical college of Lahore. Therefore, it was deficient in generalizability.

The research was conducted with the participation of a single class from a medical college in the private sector located in Lahore. Consequently, the study findings may lack generalizability due to the limited scope of the sample. This means that the conclusions drawn from the study may not be applicable to a broader population beyond the specific class and context studied.

Recommendations

More studies with a larger sample size should be conducted. Food authorities should mention the caffeine content on the labels of beverages. Awareness and interventional programs about caffeinated drinks adverse effects and dependency should be initiated in medical and university students. Monitoring the intake of such drinks and provision of education about the ill health effects is required to be given to the masses including children, adolescents, students and parents.

Ethical Approval:

This study was approved by Ethical Review Committee/Institutional Review Board (IRB) of Lahore Medical & Dental College.

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Authors' Contribution:

UN: Concept, design and analysis of the study.

SD: Acquisition, analysis of the data.

AT: Drafting introduction in the article.

AR & OZ: Interpretation of data.

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