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Evaluation of Perception, Knowledge and Attitudes of Anesthesia Healthcare Workers on Occupational Health and Safety

Anestezi Sağlık Çalışanlarının İş Sağlığı ve Güvenliği Konusunda Algı, Bilgi ve Tutumlarının Değerlendirilmesi

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ABSTRACT

Objective: Anesthesia healthcare workers work under more intense hazard, risk and excessive workload specific to their field, in addition to the problems of other healthcare workers. This study aims to identify perception of occupational risks in the working environment, knowledge about occupational health and safety (OHS), and the use of personal protective equipment in the working environment among the anesthesia healthcare workers.

Methods: This descriptive study was conducted with 153 anesthesia healthcare workers. The healthcare workers participating in the study were divided into 2 groups according to their work: physicians and non-physician healthcare workers. The questionnaire included sociodemographic, knowledge about occupational risks and Occupational Health and Safety Law (OHSL), use of personal protective equipment and knowledge of OHS in the institution questions.

Results: The frequencies of the working conditions and professional practice areas of the group of doctors being not ergonomically appropriate (p=0.005), insufficient lighting (p=0.001), insufficient heat (p<0.015), chemical agent exposure (p=0.024), ionizing radiation exposure (p=0.003), exposure to biological agents (p=0.022), exposure to psychological risk factors (p=0.017) were found to be statistically significantly higher. In this study, it was found that the perception of working environment conditions and occupational risk factors was higher in doctors, and their knowledge of OHSL and OHS practices in the institution was higher in the non-physician group.

Conclusion: The OHS trainings received by the health care workers were effective for the results. Increasing knowledge about occupational risks and preventive measures against them can reduce the incidence and consequences of possible occupational diseases.

Keywords: Anesthesia, occupational health, occupational safety

ÖZ

Amaç: Anestezi sağlık çalışanları, diğer sağlık çalışanlarının sorunlarına ek olarak, kendi alanlarına özgü daha yoğun tehlike, risk ve aşırı iş yükü altında çalışmaktadır. Bu çalışma, anestezi sağlık çalışanlarının çalışma ortamındaki mesleki risklere ilişkin farkındalıklarını, iş sağlığı ve güvenliği (İSG) konusundaki bilgilerini ve çalışma ortamında kişisel koruyucu ekipman kullanım durumlarını belirlemeyi amaçlamaktadır.

Yöntem: Bu tanımlayıcı çalışma 153 anestezi sağlık çalışanı ile yapılmıştır. Çalışmaya katılan sağlık çalışanları yaptıkları işlere göre doktorlar ve hekim olmayan profesyoneller olmak üzere 2 gruba ayrılmıştır. Ankette sosyodemografik, mesleki riskler ve İş Sağlığı ve Güvenliği Kanunu (İSGK) hakkında bilgi, kişisel koruyucu ekipman kullanımı ve kurumda İSG bilgisi soruları yer almıştır.

Bulgular: Doktor grubunun çalışma koşulları ve mesleki uygulama alanlarının ergonomik olarak uygun olmaması (p=0,005), yetersiz aydınlatma (p=0,001), yetersiz ısı (p<0,015), kimyasal madde maruziyeti (p=0,024), iyonize radyasyona maruz kalma (p=0,003), biyolojik ajanlara maruz kalma (p=0,022), psikolojik risk faktörlerine maruz kalma (p=0,017) istatistiksel olarak anlamlı derecede yüksek bulundu. Bu çalışmada doktorların çalışma ortamı koşulları ve mesleki risk faktörlerine ilişkin farkındalıklarının, doktor olmayan grupta ise İSGK bilgisi ve kurumdaki İSG uygulamalarına ilişkin farkındalıklarının daha yüksek olduğu saptanmıştır.

Sonuç: Bu çalışmanın sonuçları sağlık çalışanlarının aldığı İSG eğitimlerinin etkili olduğunu gösterdi. Mesleki risk faktörleri ve bunlara karşı önleyici tedbirler hakkında bilginin artırılması, olası meslek hastalıklarının insidansını ve sonuçlarını azaltabilir.

Anahtar sözcükler: Anestezi, iş sağlığı, iş güvenliği

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INTRODUCTION

Occupational health studies focus on the interaction between work and health-disease processes to reduce the natural hazardous conditions that include physical, psychological and social risks in the workplace, to increase the performance of the healthcare workers and to preserve their working capacity. Historically, those working in the health sector are not considered as at high risk in terms of occupational accidents and diseases. However, research on health and disease processes in healthcare workers shows that these professionals are exposed to risk factors that affect their physical and mental integrity. For this reason, it is known that employment in the healthcare sector can be dangerous for the health of the workers (1-5).

Anesthesia healthcare workers, who are directly responsible for the life of their patients, work under more intense danger, risk and excessive workload specific to their field, in addition to the problems of other healthcare workers. For this reason, the workers are affected by all negative developments arising from the health system, and health problems are worsening. Anesthesiology healthcare workers are exposed to many occupational risk factors, including anesthetic gases, ionizing radiation, inappropriate ergonomic working conditions, inadequate ventilation, noise, chemical fumes, biological agents and occupational stress (6). The risks for both the anesthesia healthcare workers and the patient increase as the work occurs in a closed, dark and poorly ventilated environment. Heavy and unsuitable working conditions also cause psychological problems in the anesthesiology healthcare workers, and psychosocial factors rank third in the list of risks exposed. As a result, psychological problems such as depression, stress, mobbing, trauma, anxiety, burnout, substance abuse, inequality, loss of confidence, panic attacks, and job dissatisfaction stand out among the workers (7).

Because of an increasingly precarious work relationship associated with a lack of knowledge of occupational hazards, anesthesiology healthcare workers work under vulnerable conditions. In this context, knowledge in the field of occupational health and safety (OHS) is important to protect the health of workers (8). The issue of OHS constitutes an important dimension of today's working life and labor law. Taking and implementing OHS measures and reducing work accidents and occupational diseases produce important consequences for workers, employers and the social security systems. The issue of OHS has been discussed in our country for a long time, and it has been argued that an independent law in this area and implementation principles based on this law should be specified. In this regard, the Occupational Health and Safety Law (OHSL) dated 20.06.2012 and numbered 6331 was put into force, and the OHS issue took its place in our legal system as a separate law and legislation (9).

This study aims to identify perception of occupational risks in the working environment, knowledge about occupational health and safety, and the use of personal protective equipment in the working environment among the anesthesia healthcare workers in a tertiary university hospital.

MATERIAL and METHODS

Study Design and Participants

The study was approved by the Ethics Committee of Istanbul University-Cerrahpasa (Date: 05.12.2019 No. 186113). This descriptive study involved workers of the Department of Anesthesiology and Reanimation in a university hospital and was conducted between January 2020 and March 2020. The aim was to apply the research questionnaire to all the healthcare workers of the Department of Anesthesiology and Reanimation who participated in the OHS training. Those who answered the questionnaire were included in the study, while those who did not complete the voluntary consent form or the questionnaire were not included in the study.

A total of 154 anesthesia healthcare workers members among the 221 (69%) individuals participated in the study. The anesthesia healthcare workers consisted of specialist physicians, research assistants, nurses, anesthesia technicians, and auxiliary staff. Participants completed the questionnaire themselves under the supervision of the person who handed out the form. The questionnaires of 1 participant were excluded from the study because they did not complete the questionnaire, and the remaining 153 (69%) participants' forms were included in the analysis. The healthcare workers participating in the study were divided into 2 groups according to their work: physicians (Group 1) and non-physician healthcare workers (Group 2). Of the 153 personnel participating in the study, 75 were in Group 1, and 78 were in Group 2.

Measurement Tools

The data were collected by using a questionnaire developed by the researchers with up-to-date literature. The questionnaire consisted of five parts. The first part included questions about the sociodemographic characteristics of the employees; the other parts probed their knowledge about occupational risks (second part), knowledge about OHSL (third part), use of personal protective equipment (PPE) (fourth part) and knowledge of OHS in the institution (fifth part).

Statistical Analysis

The data were evaluated and analyzed using the SPSS version 21 (SPSS Inc., Chicago, IL, USA) package program. In the analysis of categorical variables, Chi-square test or Fisher's exact test were used according to the suitability of the data. Mann-Whitney U test was used for the analyses of continuous

variables as the data is not normally distributed. All tests were considered; two-tailed, and p<0.05 was considered significant.

RESULTS

The study included 153 healthcare workers, most of whom were women (57.5%, n=88). The mean age of the participants was 35.0±8.6 years. When we compared the participants according to occupational groups, it was found that the mean age (p=0.002), total working time in the profession (p<0.001) and working time in the institution (p<0.001) were lower, and the frequency of married people (p=0.019) and smokers (p=0.026) was lower and the frequency of those working in the operating room (p<0.001) was higher among the group of physicians (Table I).

When the working environment conditions and occupational risk factors for the participants were compared, the frequencies of the working conditions and professional practice areas of the group of physicians being not ergonomically appropriate (p=0.005), insufficient lighting (p=0.001), insufficient heat (p<0.015), chemical agent exposure (p=0.024), ionizing radiation exposure (p=0.003), exposure to biological agents (p=0.022), exposure to psychological risk factors (p=0.017) were found to be statistically significantly higher (Table II).

When we compared the knowledge of the participants about the OHSL between the groups, it was found that the frequency of those who knew their obligations about OHS and that OHS training was compulsory in the group of physicians was significantly lower (p=0.002, p=0.012, respectively) (Table III).

When we compared the participants' knowledge about OHS between groups, the frequencies of those who knew that there was an OHS board in the institution (p=0.031), those who knew that the institution had an emergency plan (p<0.001), those who knew that OHS inspections were carried out (<0.001), those who knew that there were occupational physicians (p=0.004), and those who received OHS training (<0.001) were statistically significantly lower in the group of physicians (Table IV).

When we compared the frequency of using PPE in the working environment of the participants between the groups, the frequency of using masks in the group including the physicians was found to be significantly higher, whereas the frequency of handwashing before and after patient contact and the frequency of handwashing when leaving the hospital were found to be significantly lower (p=0.001, p=0.004, p=0.047, respectively) (Table V).

Table I. Sociodemographic and Occupational Characteristics of the Participants and Comparison Between Occupational Groups

	All (n=153)	Physicians, n(%) 75 (49)	Non-pyhsicians, n(%) 78 (51)	p
Gender, n (%)				0.964[k]
Female	88 (57.5)	43 (57.3)	45 (57.7)	
Male	65 (42.5)	32 (42.7)	33 (42.3)	
Age (year, mean±SD, median min-max)	35.0 ± 8.6 33 (29-41)	33.6 ± 8.9 30 (28-35.5)	36.4 ± 8.1 37 (30-42)	**0.002[m]**
Marital status, n (%)				**0.019[k]**
Married	94 (61.4)	39 (52)	55 (70.5)	
Single	59 (38.6)	36 (48)	23 (29.5)	
Smoker, n (%)				
Yes	50 (32.7)	17 (22.7)	33 (42.3)	**0.026[k]**
No	99 (64.7)	55 (73.3)	44 (56.4)	
Ex-smoker	4 (2.6)	3 (4)	1 (1.3)	
Working in the operating room, n (%)				**<0.001[k]**
No	68 (44.7)	13 (17.3)	55 (71.4)	
Yes	84 (55.3)	62 (82.7)	22 (28.6)	
Working time in the profession (year, mean ± SD)	10.7 ± 8.6 9 (4-14)	8.8 ± 8.9 5 (3-9.3)	12.5 ± 7.9 10.5 (8.3-17.5)	**<0.001[m]**
Working time in the institution (year, mean ± SD)	8.8 ± 8.2 6 (3-11)	7.0 ± 8.5 3.8 (2-6)	10.5 ± 7.4 10 (5-12.5)	**<0.001[m]**

[k] Chi-square test, [m] Mann–Whitney U test.

Table II. Comparison of the Participants' Perception of Working Environment Conditions and Occupational Risk Factors

	Physicians, n(%) 75 (49)	Non-pyhsicians, n(%) 78 (51)	p
Are your working conditions and professional practice areas ergonomically appropriate?			**0.005**[k]
No	49 (66.2)	33 (43.4)	
Yes	25 (33.8)	43 (56.6)	
Is the lighting sufficient in the working environment?			**0.001**[k]
No	32 (43.2)	14 (17.9)	
Yes	42 (56.8)	64 (82.1)	
Is noise in the working environment?			0.210[f]
No	1 (1.3)	5 (6.4)	
Yes	74 (98.7)	73 (93.6)	
Is the temperature sufficient in the working environment?			**0.015**[k]
No	40 (53.3)	26 (33.8)	
Yes	35 (46.7)	51 (66.2)	
Is ventilation sufficient in the working environment?			0.164[k]
No	40 (55.6)	34 (44.2)	
Yes	32 (44.4)	43 (55.8)	
Is ionizing radiation exposure in the working environment?			**0.003**[k]
No	2 (2.7)	13 (17.1)	
Yes	72 (97.3)	63 (82.9)	
Is chemical risk factor exposure in the working environment?			**0.024**[k]
No	6 (8.7)	16 (22.5)	
Yes	63 (91.3)	55 (77.5)	
Is biological risk factor exposure in the working environment?			**0.022**[k]
No	2 (2.7)	9 (13)	
Yes	71 (97.3)	60 (87)	
Is psychological risk factor exposure in the working environment?			**0.017**[k]
No	2 (2.7)	10 (13.2)	
Yes	73 (97.3)	66 (86.8)	

[k] Chi-square test, [f] Fisher Exact Test.

Table III. Comparison of the Knowledge of the Participants About the OHSL Between the Groups

	Physicians, n(%) 75 (49)	Non-pyhsicians, n(%) 78 (51)	p
Have you heard of the OHSL ?			0.066[k]
Yes	48 (64)	59 (75.6)	
No	22 (29.3)	11 (14.1)	
I don't know	5 (6.7)	8 (10.3)	
Does the OHSL apply to everyone?			0.289[k]
Yes	47 (62.7)	58 (74.4)	
No	1 (1.3)	1 (1.3)	
I don't know	27 (36)	19 (24.4)	

Table III. Cont.

	Physicians, n(%) 75 (49)	Non-pyhsicians, n(%) 78 (51)	p
Do you know your obligations regarding OHS?			**0.002**[k]
Yes	3 (4)	13 (16.7)	
Partly	25 (33.3)	39 (50)	
No	29 (38.7)	17 (21.8)	
I don't know	18 (24)	9 (11.5)	
Is risk analysis compulsory?			0.366[k]
Yes	47 (62.7)	56 (71.8)	
No	3 (4)	4 (5.1)	
I don't know	25 (33.3)	18 (23.1)	
Are OHS trainings compulsory?			**0.012**[k]
Yes	51 (68)	67 (85.9)	
No	2 (2.7)	3 (3.8)	
I don't know	22 (29.3)	8 (10.3)	
Is periodic examination compulsory?			0.563[k]
Yes	47 (62.7)	55 (70.5)	
No	4 (5.3)	4 (5.1)	
I don't know	24 (32)	19 (24.4)	
Is it compulsory to prepare an emergency plan?			0.872[k]
Yes	54 (72)	59 (75.6)	
No	2 (2.7)	2 (2.6)	
I don't know	19 (25.3)	17 (21.8)	

[k] Chi-square test, **OHS:** Occupational Health and Safety, **OHSL:** Occupational Health and Safety Law.

Table IV. Comparison of Groups in Terms of Participants' Knowledge About OHS Practices in the Institution

	Physicians, n(%) 75 (49)	Non-pyhsicians, n(%) 78 (51)	p
Is there an OHS unit in the institution?			0.069[k]
Yes	35 (46.7)	46 (59)	
No	3 (4)	7 (9)	
I don't know	37 (49.3)	25 (32.1)	
Is there an OHS board in the institution?			**0.031**[k]
Yes	14 (18.7)	29 (37.2)	
No	3 (4)	4 (5.1)	
I don't know	58 (77.3)	45 (57.7)	
Does the institution have an emergency plan?			**<0.001**[k]
Yes	3 (4)	33 (42.3)	
No	16 (21.3)	6 (7.7)	
I don't know	56 (74.7)	39 (50)	
Is ambient measurement done?			0.115[k]
Yes	12 (16)	23 (29.5)	
No	13 (17.3)	14 (17.9)	
I don't know	50 (66.7)	41 (52.6)	

Table IV. Cont.

	Physicians, n(%) 75 (49)	Non-pyhsicians, n(%) 78 (51)	p
Are OHS audits done?			**<0.001**[k]
Yes	5 (6.7)	26 (33.3)	
No	8 (10.7)	6 (7.7)	
I don't know	62 (82.7)	46 (59)	
Is there an occupational physician?			**0.004**[k]
Yes	12 (16)	31 (39.7)	
No	9 (12)	9 (11.5)	
I don't know	54 (72)	38 (48.7)	
Is there an occupational safety specialist?			0.102[k]
Yes	20 (26.7)	33 (42.3)	
No	4 (5.3)	5 (6.4)	
I don't know	51 (68)	40 (51.3)	
Have you taken OHS training?			**<0.001**[k]
Yes	17 (22.7)	65 (83.3)	
No	46 (61.3)	6 (7.7)	
I don't remember	12 (16)	7 (9)	

[k] Chi-square test, **OHS:** Occupational Health and Safety

Table V. Comparison of Groups in Terms of Participants' Use of PPE

	Physicians, n(%) 75 (49)	Non-pyhsicians, n(%) 78 (51)	p
Use of gloves			0.620[f]
No	1 (1.4)	2 (2.7)	
Yes	73 (98.6)	71 (97.3)	
Use of mask			**0.001**[k]
No	2 (2.7)	15 (20.5)	
Yes	72 (97.3)	58 (79.5)	
Use of goggles			0.414[k]
No	47 (63.5)	51 (69.9)	
Yes	27 (36.5)	22 (30.1)	
Use of apron			0.936[k]
No	36 (48.6)	36 (49.3)	
Yes	38 (51.4)	37 (50.7)	
Use of protective clothing			0.634[k]
No	56 (75.7)	52 (72.2)	
Yes	18 (24.3)	20 (27.8)	
Hand washing before and after patient contact			**0.004**[k]
No	35 (47.3)	18 (24.7)	
Yes	39 (52.7)	55 (75.3)	
Hand washing after patient contact			0.366[k]
No	44 (59.5)	38 (52.1)	
Yes	30 (40.5)	35 (47.9)	

Table V. Cont.

	Physicians, n(%) 75 (49)	Non-pyhsicians, n(%) 78 (51)	p
Hand washing after contaminated surface contact			0.814[k]
No	46 (62.2)	44 (60.3)	
Yes	28 (37.8)	29 (39.7)	
Hand washing before leaving the hospital			**0.047[k]**
No	55 (74.3)	43 (58.9)	
Yes	19 (25.7)	30 (41.1)	

PPE: Personal protective equipment.
[k] Chi-square test, [f] Fisher Exact Test.

DISCUSSION

This study was designed to evaluate the knowledge and attitudes of the anesthesia healthcare workers about OHS. The results of this study showed that the perception of the working environment and occupational risk factors was higher in physicians, while knowledge about OHS was higher in the non-physician healthcare workers. There are few publications on occupational health for anesthesia healthcare workers, and most of them are related to health regulations and recommendations of administrative institutions (10).

Due to advances in medicine and technology, the operating room and intensive care environments where anesthetists work have become increasingly physically complex. Many factors, such as the workplace, monitoring devices, medical intervention equipment, sounds and alarms, ventilation and lighting, other staff and the patient, affect the ergonomics of these environments (11). Working in an inappropriate position, ambient temperature and lighting are the leading risks associated with ergonomics in operating rooms and intensive care units. After working in an inappropriate position for a long time, musculoskeletal diseases may occur. In a recent study in our country, physical ergonomic factors in intensive care units were examined, but they were not found to be suitable for ergonomics (12). In this study, although perception of being exposed to ergonomic risk factors was high in both groups, it was found to be significantly higher in the physician group. In this study, the perception that lighting and heat were not appropriate in the working environment was found to be high in the physician group. It can be deduced that this may be because the physicians group is more affected by the ambient temperature due to the higher frequency of working in the operating room and that the operation area is not sufficiently illuminated during the operation. Considering of the results of the studies on this subject, it is clear that there is a need to improve ergonomic conditions in intensive care and operating rooms in our country.

The development of minimally invasive procedures requiring fluoroscopy has increased the risk of occupational exposure to ionizing radiation in anesthesiology healthcare workers. It is recommended to wear lead-based clothing and maintain an appropriate distance from the fluoroscopic source to avoid the stochastic effects of exposure (13). In a study conducted in our country, it was found that the team of nurses and anesthesia technicians working in the operating room were exposed to radiation more than once a week and sometimes more than once a week, and this exposure was higher than other occupational groups (14). In this study, the perception of being exposed to ionizing radiation in the physician group was found to be significantly higher than that of the non-physician healthcare workers.

Soap-detergent, substances used for sterilization purposes, anesthetic substances, surgical smoke, substances containing latex, waste gases, mercury, heavy metals, plastics, cytotoxic substances and methyl methacrylate can be listed among chemical substances in operating rooms (15). The smell of anesthetic gas increases the probability that the exposure threshold has been exceeded. The negative effects of anesthetic gases, especially on the central nervous system, have been demonstrated in experimental animals. In humans, these agents have adverse effects on many systems, especially the central nervous system (16-18). In this study, perception of being exposed to chemical risk factors was found to be significantly higher in the group of physicians. Continuous gas measurements in the operating room and intensive care units will both provide information about anesthetic gas exposure levels and give us an idea to develop strategies to prevent risk on the spot.

Biological materials are one of the main occupational risks for health care professionals. Accidents involving blood and other body fluids are the most frequently reported exposures (19). Infectious agents with the highest risk of transmission after percutaneous exposure are listed in the following order: hepatitis B, hepatitis C, and HIV (20). In this study, perception

of being exposed to biological risk factors was found to be higher in the physician group, and it was considered to be related to the fact that interventional procedures were mostly performed by physicians. While the use of gloves was present in almost all of both groups, the habit of hand washing was found more frequently in the non-physicians. Although both health legislation and medical literature recommend washing hands and wearing gloves before contacting patients, wearing gloves is not a substitute for hand hygiene due to leakage and self-contamination during glove removal (21). Studies have shown that up to 53% of gloves show leaks after use, and up to 34% of healthcare professionals exhibit positive cultures after glove removal (22). In this study, although the use of gloves as PPE was found to be high both in and out of the physicians, handwashing before and after patient contact and handwashing when leaving the hospital were found to be higher in the non-physician healthcare workers.

Although anesthesia has become increasingly safe for patients over the years, it has become increasingly stressful for the anesthesiology healthcare workers. The sensitive coordination effort of team members and the need to be constantly ready to respond significantly increase the stress of those working in surgical anesthesia and intensive care settings. Work-related stress and burnout in anesthesiologists have been addressed in several studies in recently. In a survey study conducted on 1603 anesthesia healthcare workers in France, 62% of the workers reported burnout syndrome (23). There are many studies in the literature showing that the stress level is high in anesthesiologists, but these have generally been conducted over the physician group (24,25). Likely, in our study, physicians stated that they were exposed to psychosocial risk factors significantly more than the non-physicians.

Although there is no study on the level of knowledge about OHSL among anesthesiology healthcare workers in our country in the literature, in this study, the knowledge of OHSL and OHS practices in the institution was found to be higher in the non-physician healthcare workers. Here, it can be thought that the reason why this level of knowledge is higher in the non-physician healthcare workers may be due to the high rate of participation of the non-physician healthcare workers in OHS trainings.

This study has several limitations. This study was conducted in only one hospital, and the results presented were probably influenced by institutional culture and cannot be generalized. Due to the scarcity of research on this subject in risky departments such as anesthesia, the results of this study will contribute to further research on OHS training strategies to reduce the differences between anesthesiology healthcare workers' knowledge and practices about OHS.

CONCLUSION

In this study, it was found that the perception of working environment conditions and occupational risk factors was higher in physicians, and their knowledge of OHSL and OHS practices in the institution was higher in the non-physician healthcare workers. It was thought that the OHS trainings received by the healthcare workers were effective for the results. Increasing knowledge about occupational risk factors and preventive measures against them can reduce the incidence and consequences of possible occupational diseases.

AUTHOR CONTRIBUTIONS

Conception or design of the work: NG
Data collection: NG, HYA, YO, SK, AN, YD, FA
Data analysis and interpretation: NG, HCC, MSE
Drafting the article: NG, SK
Critical revision of the article: NG, SK, MSE
All authors (NG, HCC, HYA, YO, SK, AN, YD, FA, MSE) reviewed the results and approved the final version of the manuscript.

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