

Hairdressers in Johannesburg: knowledge, attitudes and practices regarding occupational health

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ABSTRACT

Introduction: Hairdressers are exposed to hazardous chemicals in haircare products, which can cause adverse respiratory, skin, and reproductive effects. The incidence of these effects can be reduced with good occupational health and safety (OHS) knowledge, attitudes, and practices (KAP).

Objective: The objective of the study was to assess Johannesburg hairdressers' knowledge, attitudes, and practices towards occupational health and safety.

Methods: Three hundred and eighty-three hairdressers were recruited into this cross-sectional study. They were categorised into employees/wage earners (earning a salary or wage, n = 151), or business owners (self-employed, n = 232). Data were collected using an interviewer-administered questionnaire. The data were analysed using Statistical Package for Social Sciences (SPSS) version 26. Frequency tables were generated and chi-square tests were used to test differences between KAP amongst business owners and wage earners.

Results: Most of the study participant were female (n = 237, 61.9%). A higher proportion of business owners than wage earners knew that hairdressing was hazardous to their health, in general (n = 44, 29.1% and n = 120, 51.7%, respectively), and with regard to specific health risks such as asthma, cancer, and skin diseases. However, more of the wage earners than the business owners had good attitudes towards the wearing of personal protective equipment (PPE) such as gloves, (n = 143, 94.7% and n = 210, 90.5%, respectively). Overall, wage earners practised better OHS than business owners, e.g. 67.5% (n = 102) and 55.2% (n = 128) reported that they wore gloves, respectively.

Conclusion: Wage earners had poorer OHS knowledge than those who owned or operated hairdressing salons. Both had good attitudes towards OHS, but self-employed hairdressers had poorer OHS practices. Training, including workshops and seminars, is needed to improve KAP regarding OHS amongst all hairdressers, regardless of their employment status.

INTRODUCTION

Hairdressers improve the aesthetics of their customers' hair, through the application of haircare products such as shampoos, conditioners, relaxers, bleaches, dyes, sprays, and perfumes. The demand for hairdressing services has increased exponentially over the past decade due to changing fashion trends.¹⁻² Hairdressers' health is often compromised as the products they use expose them to many potentially hazardous chemicals,³⁻⁴ which may cause adverse health effects such as skin disorders, breathing problems, reproductive disorders, congenital disabilities, and cancer.⁵⁻⁸ Chemicals in haircare products enter the body mainly through dermal, inhalation, and ingestion routes.⁸ Hairdressers are also potentially exposed to chemicals in nail products because they often share their work environments with nail technicians.⁶

Everyone in South Africa has the right to an environment (including the work environment) that is not harmful to their health and wellbeing, in terms of the Constitution and the Occupational Health and Safety Act No. 83 of 1993. However, this is difficult to monitor in many sectors, including the beauty industry, as there is no national reporting system that accurately reflects the extent of occupational diseases associated with hairdressing and other occupations. Self-employed workers and those in the informal sector are at high risk from exposures to hazardous chemicals, as they usually operate from unconventional and unprotected workplaces such as homes and public spaces that

are difficult to regulate or monitor.⁹⁻¹² A local study, published in 2013, reported that most haircare product consumers were unaware of the health risks associated with exposure to such products.¹²

Poor occupational health and safety (OHS) is often associated with a lack of resources, inadequate guidance, insufficient training opportunities, lack of cooperation (between employers and employees), language barriers, and poor educational background.¹⁰⁻¹¹ Knowledge and attitudes are some of the most critical enablers of, or barriers to, OHS compliance.¹⁰⁻¹³ Human factors such as lack of knowledge and interest, negative attitudes, unsafe behaviour, and incompetence are associated with most work-related accidents.^{11,14} Hairdressers' OHS knowledge, attitudes, and practices (KAP) are often influenced by demographic, social, cultural, and economic characteristics,¹⁵⁻¹⁷ such as sex,¹⁸ age,¹⁶ educational background,^{5,16} work experience,¹⁹⁻²⁰ working hours, and business ownership.²⁰ In a study conducted in France by Deschamps et al. (2014), self-employed hairdressers had lower overall health than those who were wage earners.²¹ The authors attributed this to wage earners' "longer working hours, fewer protective measures and the absence of preventive medicine in the work-place".²¹

The aim of our study was to assess Johannesburg hairdressers' knowledge, attitudes, and practices towards OHS, and compare these in self-employed hairdressers who run or operate their own businesses, and employed hairdressers who earn a wage or salary and typically work under supervision.²²

METHODS

A cross-sectional study was conducted amongst hairdressers in Johannesburg to assess their OHS KAP. The population in this area is young and growing, partly due to the influx of new homeowners attracted by improved housing, land value, recreational facilities, and convenient transport to various places of work.²³ The study population comprised hairdressers aged 18–65 years, working in beauty salons in Johannesburg South. A register of salons was obtained from the Environmental Health Department of the City of Johannesburg, Region F South. Additional salons in the same area, not listed in the register, were identified during data collection. A sample size of 383 was calculated, using EPINFO (Centers for Disease Control and Prevention), which was increased to 400 in anticipation of non-responses. Convenience sampling was used to select potential participants.

Data collection

A questionnaire was developed, based on information from published studies. After conducting a pilot study, the self-administered questionnaire contained 38 closed-ended questions and comprised four sections: socio-demographic characteristics, OHS knowledge, OHS attitudes, and OHS practices. Content validity was performed

by four environmental health practitioners from the City of Johannesburg, whose work entailed inspecting hairdressing salons from a health and safety point of view. Participants were only recruited after they had signed a written informed consent form.

The study was approved by the Research Ethics Committee (REC) of the Department of Environmental Health at the University of Johannesburg (clearance number: REC-827-2020). Permission to utilise the hairdressing salon register was granted by the City of Johannesburg.

Data analysis

The Statistical Package for Social Sciences (SPSS Inc., Chicago, USA), version 26 was used for data analysis. Continuous variables, such as age and years of work experience were categorised to provide better context for data analysis and interpretation. Frequency tables were generated and chi-square analysis was used to test differences in responses to questions between the wage earners and business owners. A p value of less than 0.05 was considered as the cut-off point for statistical significance.

RESULTS

Socio-demographic characteristics

Four hundred hairdressers were invited to participate; 383 agreed (95.8% response rate). Two hundred and thirty two of the hairdressers (60.6%) were self-employed (salon owners/operators); and 151 (39.4%) were employed by others (salaried or wage earners) (Table 1). Although most of the participants were female (n = 237, 61.9%), the proportion of males in the self-employed group was higher than that in the employed group (n = 106, 45.7% and n = 40, 26.5%, respectively). Nearly half of the employed participants in both groups were 30 to 44 years of age. More than 70% of the participants in both groups had a secondary school education as their highest qualification. The proportion of self-employed participants (n = 34, 14.7%) with a college or tertiary education was twice that of the employed participants (n = 11, 7.3%). Most of the participants worked out of formal structures. A higher proportion of self-employed hairdressers (n = 83, 35.8%) worked from informal structures than did employed hairdressers (n = 38, 25.2%). A higher proportion of self-employed than employed participants had worked for more than 10 years (n = 31, 13.4% and n = 11, 7.3%, respectively). The proportion of self-employed study participants who had received training from hairdressing schools (n = 32, 13.8%) was more than double that of the employed participants (n = 8, 5.3%). Most of the participants in both groups had been trained by friends/family or 'on the job', viz. 94.7% and 67.7% of the employed and self-employed hairdressers, respectively.

Employment status was significantly associated with sex, age group, education, facility type, experience, and training. A larger proportion of women than men were wage earners. A higher proportion of wage earners than business owners were younger than 25 years, had less than secondary school education, operated from formal structures, and had less than six years' working experience. However, a higher proportion of self-employed participants than wage earners had formal training.

OHS knowledge

As shown in Table 2, several aspects of OHS knowledge were associated with employment status. A statistically significantly larger proportion of business owners than wage earners knew that there are health and safety risks associated with hairdressing, such as exposure to hazardous chemicals; and cancer, asthma, and skin problems. There were no differences in knowledge about

Table 1. Socio-demographic characteristics and associations with employment status (N = 383)

Characteristic	Employment status				p value
	Formally employed n = 151		Self-employed n = 232		
	n	%	n	%	
Sex					
Female	111	73.5	126	54.3	< 0.001
Male	40	26.5	106	45.7	
Age (years)					
18–24	18	11.9	11	4.7	0.033
25–29	51	33.8	96	41.4	
30–44	75	49.7	110	47.4	
≥ 45	6	3.9	15	6.5	
Missing	1	0.7	0	0	
Education					
None/primary	32	21.2	31	13.3	0.021
Secondary	106	70.2	167	72.0	
College/tertiary	11	7.3	34	14.7	
Missing	2	1.3	0	0	
Facility					
Formal structure	111	73.5	148	63.8	0.033
Informal structure*	38	25.2	83	35.8	
Missing	2	1.3	1	0.4	
Experience (years)					
< 1	4	2.6	17	7.3	0.023
1–2	23	15.2	20	8.6	
3–5	67	44.4	88	37.9	
6–10	46	30.5	76	32.8	
> 10	11	7.3	31	13.4	
Skills training					
Hairdressing school	8	5.3	32	13.8	0.024
Friend/family	94	62.3	125	53.9	
On the job	49	32.4	72	31.0	
Missing	0	0	3	1.3	

Table 2. Associations between OHS knowledge and employment status (N = 383)

Knowledge	Formally employed n = 151		Self-employed n = 232		p value
	n	%	n	%	
Hairdressing is dangerous to health and safety					
Yes	44	29.1	120	51.7	< 0.001
No	107	70.9	111	47.8	
Missing	0	0	1	0.4	
Some hairdressing activities expose you to hazardous chemicals					
Yes	67	44.4	137	59.1	0.005
No	84	55.6	95	40.9	
Some haircare products may cause cancer					
Yes	69	45.7	136	58.6	0.012
No	82	54.3	95	41.0	
Missing	0	0	1	0.4	
Some haircare products may cause asthma					
Yes	70	46.4	147	63.4	< 0.001
No	81	53.6	84	36.2	
Missing	0	0	1	0.4	
Some haircare products may cause skin diseases					
Yes	84	55.6	158	68.1	0.011
No	67	44.4	73	31.5	
Missing	0	0	1	0.4	
Some haircare products may cause reproductive problems					
Yes	46	30.5	72	31.0	0.951
No	103	68.2	159	68.6	
Missing	2	1.3	1	0.4	
Trained on hairdressing health and safety					
Yes	36	23.8	62	26.7	0.536
No	114	75.5	169	72.9	
Missing	1	0.7	1	0.4	
Hand washing with water and soap can prevent these chemicals from getting into your body					
Yes	117	77.5	174	75.0	0.501
No	33	21.8	58	25.0	
Missing	1	0.7	0	0	
It is necessary to wear gloves when working with haircare products					
Yes	120	79.5	187	80.6	0.786
No	31	20.5	45	19.4	
Hairdressing activities require you to wear a mask					
Yes	94	62.3	172	74.1	< 0.001
No	57	37.7	60	25.9	
It is important to read product labels before use					
Yes	113	74.8	186	80.2	0.217
No	38	25.2	46	19.8	
Understand what is written on the product label					
Yes	108	71.5	182	78.4	0.104
No	43	28.5	49	21.1	
Missing	0	0	1	0.4	

reproductive issues. Nevertheless, knowledge about these issues was generally poor, ranging from 29.1% to 68.1%. The proportions of participants in the two groups that had received health and safety training were similarly low, viz. 23.8% and 26.7% of wage earners and business owners, respectively.

With regard to protecting themselves, a high proportion of both groups knew that hand washing was important (77.5% and 75.0% of wage earners and business owners, respectively), and that they should wear gloves (79.5% and 80.6%, respectively). However, a smaller proportion of wage earners (62.3%) than business owners (74.1%) knew that they should wear masks ($p = 0.014$). The importance of reading product labels with regard to the contents, and the understanding thereof, was known by more than 75% of participants from both groups; the differences were not statistically different.

OHS attitudes

Only attitudes regarding the necessity of having a hairdressing qualification and washing hands after handling products were significantly associated with employment status. A significantly larger proportion of the self-employed participants ($n = 125$, 53.9%) said that it was necessary to have a hairdressing qualification, than the wage earners ($n = 57$, 37.7%) (Table 3). Most participants from both groups ($\geq 90\%$) said that gloves

and/or masks should be worn during hairdressing activities; the differences between the two groups were not significant. Likewise, high proportions of both groups said that hands should be washed – after each client and after handling products (81.9% to 92.0%). The proportions of each group that had positive attitudes towards wearing eye protection and/or aprons ranged from 72.4% to 83.4%. Again, differences were not statistically significant. More than 70% of participants from both groups took information on product labels seriously.

OHS practice

There were several associations between OHS practices and employment status, viz. the wearing of goggles ($p = 0.019$), gloves ($p = 0.018$) and/or masks ($p = 0.023$), and washing hands before and/or after clients ($p < 0.001$ and $p = 0.013$, respectively). Most of the participants (70.5%) did not have a health and safety policy in the salons. Most did not wear personal protective equipment (PPE) in the form of aprons and goggles (66.1% and 68.7%, respectively), but most did wear gloves (60.1%). A larger proportion of the business owners than the wage earners wore masks (30.1% and 19.2%, respectively), but hand washing was practised by a larger proportion of the wage earners than the business owners. Overall, practices regarding closing containers and mixing haircare products in well-ventilated spaces was good (81.7% for both practices, overall).

Table 3. Associations between OHS attitudes and employment status (N = 383)

Attitude	Formally employed n = 151		Self-employed n = 232		p value
	n	%	n	%	
Necessary to have a hairdressing qualification					
Yes	57	37.7	125	53.9	< 0.001
No	90	59.6	98	42.2	
Missing	4	2.7	9	3.9	
Wearing gloves when performing hairdressing duties					
Yes	143	94.7	210	90.5	0.310
No	8	5.3	22	9.5	
Wearing mask when performing hairdressing duties					
Yes	140	92.7	208	89.7	0.310
No	11	7.3	24	10.3	
Washing hands after each client					
Yes	139	92.0	201	86.6	0.101
No	12	8.0	31	13.4	
Washing hands after handling haircare products					
Yes	134	88.7	190	81.9	0.058
No	16	10.6	41	17.7	
Missing	1	0.7	1	0.4	
Wearing eye protection (goggles)					
Yes	116	76.8	168	72.4	0.336
No	35	23.2	64	27.6	
Wearing apron					
Yes	126	83.4	176	75.9	0.088
No	25	16.6	55	23.7	
Missing	0	0	1	0.4	
Taking information written on the product label seriously					
Yes	118	78.1	169	72.8	0.223
No	32	21.2	62	26.7	
Missing	1	0.7	1	0.4	

Table 4. Associations between OHS practice and employment status (N = 383)

Practice	Formally employed n = 151		Self-employed n = 232		p value
	n	%	n	%	
Have a health and safety policy					
Yes	12	7.9	33	14.2	0.178
No	100	66.2	170	73.3	
Missing	39	25.9	29	12.5	
Wear an apron					
Yes	47	31.1	80	34.5	0.533
No	102	67.6	151	65.1	
Missing	2	1.3	1	0.4	
Wear goggles					
Yes	54	35.8	59	25.4	0.019
No	92	60.9	171	73.7	
Missing	5	3.3	2	0.9	
Wear gloves					
Yes	102	67.5	128	55.2	0.018
No	49	32.5	103	44.4	
Missing	0	0	1	0.4	
Wear a face mask					
Yes	117	77.5	160	69.0	0.023
No	29	19.2	70	30.1	
Missing	5	3.3	2	0.9	
Wash hands before each client					
Yes	120	79.5	154	66.4	< 0.001
No	27	17.9	77	33.2	
Missing	4	2.6	1	0.4	
Wash hands after each client					
Yes	123	81.5	165	71.1	0.013
No	26	17.2	66	28.5	
Missing	2	1.3	1	0.4	
Wash hands after handling haircare products					
Yes	123	81.5	174	75.0	0.159
No	28	18.5	57	24.6	
Missing	0	0	1	0.4	
Read haircare products label before use					
Yes	101	66.9	149	64.3	0.570
No	49	32.4	82	35.3	
Missing	1	0.7	1	0.4	
Follow all safety procedures on the product label					
Yes	125	82.8	178	76.7	0.106
No	24	15.9	53	22.9	
Missing	2	1.3	1	0.4	
Close containers of haircare products when not in use					
Yes	128	84.8	185	79.7	0.170
No	21	13.9	45	19.4	
Missing	2	1.3	2	0.9	
Prepare (mix) haircare products in a well-ventilated space					
Yes	130	86.1	183	78.9	0.065
No	19	12.6	46	19.8	
Missing	2	1.3	3	1.3	

DISCUSSION

Most of the employed hairdressers in this study were young, had low levels of education, limited work experience, and learnt hairdressing from family or friends. Globally, hairdressing is characterised by a young workforce.²⁴⁻²⁷ Hairdressing is viewed as a talent-based occupation for those who dropped out of school.²⁸ Supporting this is the high number of unqualified hairdressers (refers to anyone who performs the functions of a hairdresser but has not qualified as such) in South Africa.²⁸

Hairdressing is a female-dominated sector²¹ and has traditionally been perceived as feminine in nature.²⁹ Although both occupational categories were dominated by women, the vast majority of employed participants were women, while a smaller majority of business owners were women. Similar findings were reported by Verheul et al. (2006) in Europe and the United States.³⁰ They reported that self-employment was more common among men than women, and concluded that women prefer waged employment because it provides regular income, stability, and social security. In general, self-employment is viewed as more challenging (due to its unpredictable income and long working hours) than working for someone else. In this regard, men are thought to be more risk tolerant than women.^{31,32}

Employment status was significantly associated with sex, age, education, facility type, work experience, and skills training in our study. Similar findings were reported in a French study by Deschamps et al. (2014), in which it was reported that socio-demographic characteristics differed between employed and self-employed hairdressers.²¹

Rendering hairdressing services from an informal structure was more common for those who were self-employed. A previous study in Johannesburg by Mpye (2013) found that most self-employed hairdressers were operating from the street.³³ In the same study, it was found that many self-employed hairdressers used to work from formal structures, but were forced onto the street due to high costs and rentals.³³ Assessing the relationship between employment status and socio-demographic factors is crucial, as studies suggest that they influence OHS knowledge, attitudes, and practices.^{10-11,15-17}

OHS knowledge regarding chemical hazards

In our study, significantly more self-employed participants stated that hairdressing was hazardous to their health and safety than those who were employed. This is in contrast with a study conducted in Tanzania by Bigambo (2017), where a little more than half (52.2%) of the participants indicated that hairdressing was safe.²⁵ A significantly higher proportion of employed than self-employed participants were unaware that hairdressing activities were associated with health problems such as cancer, asthma, and skin diseases. In general, knowledge about these health risks was low. This is in line with previous studies, which found that most participants were unaware that hairdressing activities exposed them to cancer, asthma, and skin diseases.^{17,34} However, our findings were inconsistent with those from studies conducted in Egypt (2020)³⁵ and western Nepal (2012),²⁴ which found that most participants were aware of diseases associated with hairdressing.

Around 25% of the participants in our study said that they were not trained on hairdressing health and safety. Different findings have been reported elsewhere. For example, Khalaf et al. (2020) reported that only 5.3% of the hairdressers in a study in Egypt received occupational health and safety training,³⁵ while Sedhain et al. (2012) reported that, in western Nepal, 81.7% of study participants

attended such training.²⁴ Our findings could be attributed to employers' unwillingness and/or inability to provide OHS training as well as poor access to safety information by employees in small-scale enterprises.^{11,36} This could be related to the fact that there is no forum in South Africa where hairdressers can get health and safety information. Such forums exist elsewhere in the world, such as in the USA, where the California Healthy Nail Salon Collaborative (HNSC), which is made up of authorities, salon workers, and their employees, lobbies for support for worker safety and health.³⁷

The association between employment status and OHS knowledge about wearing masks was statistically significant in our study. More than two-thirds of our study participants knew that they should wear masks. In contrast, in a study reported by Olaoye et al. (2019) in Nigeria, more than half (51.4%) of the participants were unaware that masks could protect them from chemical exposure.³⁸ The high level of knowledge about masks in our study could be attributed to the fact that the study was conducted during the COVID-19 pandemic when wearing of masks was mandatory for all.

In general, employed participants in our study had poorer OHS knowledge than the business owners, which might be associated with lower educational level, less work experience, and learning hairdressing from family or friends. Lack of OHS knowledge amongst employed participants was anticipated because salon owners appoint hairdressers based on their technical skills, and often neglect OHS educational and training backgrounds.^{27,33}

These findings suggest that employers within the hairdressing industry could be in contravention of Section 8 of the Occupational Health and Safety Act No. 85 of 1993, which stipulates that it is the employer's responsibility, not the employee's, to provide OHS training. These non-compliances may also be attributed to the fact that hairdressing salons that operate from unconventional places such as homes, roadsides, and informal market places are unregulated.¹¹ Similar to other occupations in the informal sector, hairdressers often work under informal arrangements that do not provide labour protection.^{11,33}

OHS attitudes

More self-employed participants than business owners did not think it was necessary to have training. This finding was expected as the majority of the participants did not have a hairdressing qualification. Hairdressing is generally not a well-respected profession in South Africa,³⁹ as it is perceived to be a profession for those who struggled at school, and most people are not aware that hairdressing requires a high level of intellectual capability.²⁸

Most of our study participants had good attitudes towards washing their hands after each client. A study conducted in Tanzania by Kirunda (2006) had similar findings; 95% of the participants had good attitudes towards washing hands between clients.²⁷ We also found that attitudes towards washing hands after handling hair-care products were positive in a high proportion of hairdressers. In a Nigerian study by Eyo et al. (2016), a similarly high proportion (81.3%) of the participants had positive attitudes towards washing hands after each client.¹⁹ Similarly, a high proportion of hairdressers in our study (76.8% to 83.4%) had positive attitudes towards the use of eye protection and aprons. Attitudes towards OHS measures such as PPE and hand hygiene may be influenced by the provision of PPE, facilities, and appropriate supervision.¹⁸

OHS practices

Hairdressers are exposed to several hazards due to the nature of their work. Hence, the present study assessed hairdressers' OHS practices. Most of our study participants reported that they were not using

eye protection. This result was consistent with findings from a study by Bigambo (2017) in Tanzania, where 78.7% of the hairdressers indicated that they had never used eye protection.²⁵

Contrary to this, most of the hairdressers in our study said they wore gloves during hairdressing activities. Nemer (2009), in a study in Palestine, also found that most (92%) of the participants reported they wore gloves.³⁴ This could be influenced by the fact that gloves are included in the packaging of many haircare products. While most of our study participants said that they wore masks, Nemer (2013, 2009) reported that only 11% of the hairdressers in a Palestinian study were using masks.^{7,34} Again, the use of masks reported in our study may be linked to the mask mandate implemented during the COVID-19 pandemic.

Our finding that more wage earners than business owners were using PPE suggests that, to some degree at least, employers are fulfilling their legal mandate, stipulated in Section 8 of the Occupational Health and Safety Act No. 85 of 1993, to provide PPE to their employees. Workers usually wait for the employer to provide them with PPE, rather than taking the initiative to acquire their own, suggesting that employers were providing PPE. However, the business owners also need to use PPE.

Overall, it appeared that the self-employed participants' OHS practices were poor, which may be attributed to the fact that most of them view OHS as an unnecessary expense rather than an investment.¹⁰

Strengths and limitations

Because of the cross-sectional design of this study, no causal associations could be established. We relied on participants' responses and assumed that they provided truthful answers. Nevertheless, this study was one of the first attempts to assess hairdressers' OHS knowledge, attitudes, and practices in Johannesburg, South Africa. The findings can inform OHS policies and regulations in the hairdressing industry.

CONCLUSION

Employed hairdressers were less knowledgeable about occupational risks and protective measures than those who were self-employed. More employed participants than self-employed had good attitudes towards OHS and good OHS practices. Nonetheless, there is an urgent need to address poor OHS knowledge, attitudes, and practices within the hairdressing sector by increasing monitoring and providing regular training, workshops, and seminars. Future studies may consider utilising observational and qualitative approaches, as they may reveal deeper insights about OHS in this worker population.

KEY MESSAGES

1. Overall, OHS knowledge was average, but business owners (self-employed hairdressers) had better OHS knowledge than wage earners.
2. Attitudes towards OHS were good in both employment groups.
3. There is room for improvement regarding OHS practices among both employed and self-employed hairdressers.
4. OHS knowledge, attitudes, and practices may be improved with formal training and workshops.

DECLARATION

The authors declare that this is their own work; all the sources used in this paper have been duly acknowledged and there are no conflicts of interest.

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AUTHOR CONTRIBUTIONS

Conception and design of the study: KVM, WU

Data acquisition: KVM

Data analysis: KVM

Interpretation of the data: KVM, WU, PCR

Drafting of the paper: KVM, WU, PCR

Critical revision of the paper: KVM, WU, PCR

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