

ORIGINAL ARTICLE

Quality of Life and its Association with Depression, Anxiety and Stress among Environmental Health Officer (EHO) and Assistant Environmental Health Officer (AEHO) in Selangor During 2019 Coronavirus Pandemic (COVID-19)

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ABSTRACT

Introduction: Environmental Health Officers (EHO) and Assistant Environmental Health Officers (AEHO), are among the front liners involved in combating COVID-19 pandemic in Malaysia. The overburdening strain, prolonged working hours, and inability to take time off have had an indirect psychological impact on them, resulting in a quality-of-life imbalance. Hence, the aim of this study was to investigate the likelihood and associated factors contributing to depression, anxiety, stress, and Quality of Life (QoL) of EHO and AEHO in Selangor during the COVID-19 pandemic. **Methods:** A cross-sectional study involving 170 participants was conducted in Selangor through the distribution of an online survey. The survey comprised of sociodemographic data, Depression, Anxiety and Stress Screening 21 Item Questionnaire (DASS-21) and Short Form 36 Health Survey Questionnaire (SF-36). **Results:** Approximately, 54.7%, 68.8% and 25.9% of respondents suffered from depression, anxiety, and stress, respectively. Marital status was the only factor associated with stress among the respondents. The tested domains of QoL such as physical functioning, social functioning and emotional well-being showed a decrease in mean value when compared to Malaysian norm. It was observed that the QoL was afflicted with gender, marital status, and number of children. The study also proved that there are significant negative correlations between QoL with depression, anxiety, and stress. **Conclusion:** Reduced QoL among environmental health practitioners was associated with depression, anxiety, and stress during the COVID-19 pandemic. Government agencies or employers should impose an intervention programme, such as work rescheduling or a day off, to restore balance.

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INTRODUCTION

The outbreak of 2019 coronavirus disease (COVID-19) was first reported in Wuhan, Hubei Province, China at the end of 2019. On 31st January 2020, the World Health Organisation (WHO) declares that the COVID-19 outbreak is a global health emergency (1). Through

the National Crisis Preparedness and Response Centre (CPRC), the first three reported cases of COVID-19 were received by the Malaysia Ministry of Health (MOH) on January 23rd, 2020, which were two in Sabah and one in Selangor (2). It took two days for the case to be confirmed as positive COVID-19 case. Since then, COVID-19 cases had keep increasing and has spread in many states in Malaysia. In order to control the spread of the virus, the MOH played a crucial role in ensuring maximum readiness (2). This includes the enforcement of health screening at all points of entry (3). Other than that, the healthcare frontliners such as medical

officers, nurses, and environmental health officers need to work extra hours with heavy workload in handling the outbreak during the period and beyond. Other than doctors and nurses, environmental health officers are often overlooked in controlling this transmission (4). The environmental health officers are gazetted as Authorised Officers under the Prevention and Control of Infectious Disease Act 1988.

According to the Malaysian Association of Environmental Health (2020), environmental health practitioners such as environmental health officers (EHO) and assistant environmental health officers (AEHO) have high responsibilities and duties during the COVID-19 pandemic based on the Prevention and Control of Infectious Disease Act 1988 (5). The EHO and AEHO are responsible in screening of travellers at the borders, conduct cases investigation, perform contact tracings, and monitor quarantine centre and persons under surveillance or those who are self-quarantined at homes. Besides that, they are also responsible in supervising the burials of COVID-19 corpses, monitoring the compliance of SOPs during the various phases of Movement Control Orders, and enforcing the requirements of Lockdowns (Mass Movement Control Phases).

The physical and mental well-being of environmental health practitioners are associated with the increase of workload, physical exhaustion, and inadequate personal protective equipment (6). Previous study has examined a single factor and its effect on healthcare frontliners' psychological status and quality of life (QoL). Unfortunately, environmental health practitioners are often affected by more than one contributor due to the various tasks and responsibilities. Therefore, the study aims to examine the level of depression, anxiety, stress, and quality of life of EHO and AEHO in Selangor during COVID-19 pandemic in Malaysia and to correlate depression, anxiety and stress as factors that contribute to the quality of life of EHO and AEHO in Selangor.

air. People in high-risk categories should limit their outdoor activities, especially when the city's air quality has been severely reduced because the air inside is cleaner in terms of particle matter than the air outside. A wide range of I/O ratios can be observed across a variety of building characteristics such as interior particle sources, building crack geometry, external wind settings, ventilation patterns, and filtering use among others (19). This study filled the gap of concurrently focusing on the measurement of the indoor and outdoor RSP to investigate the trend, ratio, and relationship between parameters in the industrial and commercial settings.

MATERIALS AND METHODS

Study Design

A cross-sectional study was conducted through online platform between February and May 2021. Fear,

fatigue, anxiety, depression, and quality of life were quantitatively evaluated using Depression Anxiety Stress Scale (DASS) and 36-Item Short Form Health Survey (SF-36). The questionnaire was distributed until the data collection reached sample size.

Research Tools

The Depression Anxiety Stress Scale (DASS) is a self-reporting tool which is designed to measure the negative emotional states of depression, anxiety and stress. There are 14 items in the three scales of DASS which are further divided into two to five subscales. The Depression scale evaluates hopelessness, dysphoria, self-deprecation, devaluation of life, lack of interest/involvement, anhedonia, and inertia. The autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect are assessed from the Anxiety scale. The Stress scale evaluates difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive and impatient. The respondents need to rate the extent of the scales using four-point severity or frequency which they have experienced over the past week. The total scores for the relevant items are calculated to attain the scores for Depression, Anxiety and Stress among the respondents.

The SF-36 questions are intended to represent 8 health domains, including physical function, pain, general health, vitality, social function, emotional role, and mental health. Four scales in the physical health are measured which include the physical functioning (10 items), role-physical (4 items), bodily pain (2 items), and general health (5 items). Scales in the mental health include vitality (4 items), social functioning (2 items), role-emotional (3 items), and mental health (5 items). A higher score indicates a better condition of health.

Sampling Strategy

According to Selangor State Health Department (2020), there are a total of three hundred environmental health officers working in Selangor. The estimated sample size is calculated using online Raosoft Software. The sample size of the study requires at least 169 respondents. The respondents of the study are EHO or AEHO who are working under Selangor State Health Department or Selangor Local Authority during pandemic COVID-19 located in Gombak, Hulu Langat, Hulu Selangor, Klang, Kuala Langat, Kuala Selangor, Petaling, Sabak Bernam and Sepang. The questionnaires were distributed to the EHO and AEHO through online form to achieve confidence level of 95% and 5% margin error. The data collection was carried out simultaneously from February 2021 to May 2021. All responses were automatically recorded using google form.

Data Analysis

Statistical Package for Social Sciences (SPSS) version 25 was used to analyse the data. Descriptive statistics, frequency distribution and mean were used to analyse

the sociodemographic information. Pearson's chi-square test was used to determine the association between dependant and independent variables (7). To determine the correlation of quality of life with the depression, anxiety, and stress among EHO and AEHO, bivariate logistic regression analysis was used. The significance level was obtained with p-value < 0.05 and confidence interval (CI) of 95%.

Ethical Clearance

This research was approved by the UiTM Research Ethics Committee with the reference number REC/08/2021 (MR/703).

RESULT

Sociodemographic Analysis

A total of 170 respondents had participated in the online survey. The sociodemographic information was tabulated in Table I. Majority of the respondents were female (61.2%) while male was 38.8%. About 57.1% of the respondents were married while 42.9% were single. None of the respondents were divorced or a single parent. From the data obtained, about half of the respondents (50.6%) have no children, 11.8% have at least a child, 14.1% have two children, 17.6% have three children and 5.9% have the maximum number of children which is four. From the eleven district offices and local authorities in Selangor, Petaling district had the highest number of respondents (21.8%) followed by Hulu Selangor and Klang (13.5%), Gombak and Hulu Langat (10%), Kuala Langat (7.6%), Kuala Selangor (6.5%), Sabak Bernam (6.5%), and Sepang (10.6%).

Table I: Sociodemographic data of the respondents

Variable	Frequency	Percentage (%)
Gender		
Male	66	38.8
Female	104	61.2
Marital Status		
Single	73	42.9
Married	97	57.1
Number of Children		
0	86	50.6
1	20	11.8
2	24	14.1
3	30	17.6
4	10	5.9
Working District		
Gombak	17	10.0
Hulu Langat	17	10.0
Hulu Selangor	23	13.5
Klang	23	13.5
Kuala Langat	13	7.6
Kuala Selangor	11	6.5
Petaling	37	21.8
Sabak Bernam	11	6.5
Selangor	18	10.6

Depression, Anxiety and Stress among EHO and AEHO in Selangor during COVID-19

The marks obtained from each question were calculated based on the three categories which are depression, anxiety, and stress (Table II). The scores then were categorised according to the degree of depression, anxiety and stress which are normal, mild, moderate, severe, and very severe. The results indicated that 45.3% of the respondents had normal depression, while about 32.4%, 20.0% and 2.4% had mild, moderate, and severe depression, respectively. Approximately, 31.2% of respondents had normal anxiety. The highest percentage among respondents was observed at moderate anxiety (34.1%), followed by mild and severe anxiety each at 14.1% and followed by very severe (6.5%). Majority of the respondents had normal stress (74.1%) while 15.3% and 10.6% had mild and moderate stress, respectively. None was found to have severe or very severe stress.

Table II: Percentage distribution of depression, anxiety, and stress in different subscale

Subscales	Depression		Anxiety		Stress	
	Fre- quency	Per- centage (%)	Fre- quen- cy	Per- cent- age (%)	Fre- quency	Per- cent- age (%)
Normal	77	45.3	53	31.2	126	74.1
Mild	55	32.4	24	14.1	26	15.3
Moderate	34	20.0	58	34.1	18	10.6
Severe	4	2.4	24	14.1	0	0
Very Severe	0	0	11	6.5	0	0

Association of Sociodemographic Characteristics with Depression, Anxiety and Stress

Table III shows the distribution of sociodemographic characteristics with depression, anxiety and stress among the respondents which were categorised as 'Yes' and 'No'. Although depression, anxiety and stress were higher in females compared to males, no significant associations were found among these variables. Respondents who were married had higher depression, anxiety, and stress than those who were single. However, from the Chi-Square Test performed, significant association was only observed for stress which indicated that stress was influenced by marital status (p= 0.031). The number of children had no significant associations with depression, anxiety, and stress among respondents. The percentages of respondents reporting depression and anxiety were higher for each group based on the number of children except for stress. Respondents working in Petaling reported higher depression, anxiety and stress compared

Table III: Percentage distribution of sociodemographic characteristics with depression, anxiety and stress in different variables

Variables	Depression		Anxiety		Stress	
	No <i>n</i> (%)	Yes <i>n</i> (%)	No <i>n</i> (%)	Yes <i>n</i> (%)	No <i>n</i> (%)	Yes <i>n</i> (%)
Gender						
Male	31 (47.0 %)	35 (53.0 %)	24 (36.4 %)	42 (63.6 %)	50 (75.8 %)	16 (24.2 %)
Female	46 (44.2 %)	58 (55.8 %)	29 (27.9 %)	75 (72.1 %)	76 (73.1 %)	28 (26.9%)
<i>p</i> value	0.727		0.245		0.697	
Marital Status						
Single	37 (50.7 %)	36 (49.3 %)	27 (37.0 %)	46 (63.0 %)	48 (65.8 %)	25 (34.2 %)
Married	40 (41.2 %)	57 (58.8 %)	26 (26.8 %)	71 (73.2 %)	78 (80.4 %)	19 (19.6 %)
<i>p</i> value	0.221		0.156		0.031	
Number of Children						
0						
1	41 (47.7 %)	45 (52.3 %)	31 (36.0 %)	55 (64.0 %)	60 (69.8%)	26 (30.2 %)
2	10 (50.0 %)	10 (50.0 %)	4 (20.0 %)	16 (80.0 %)	13 (65.0 %)	7 (35.0 %)
3	11 (45.8 %)	13 (54.2 %)	9 (37.5 %)	15 (62.5 %)	20 (83.3 %)	4 (16.7 %)
4	13 (43.3 %)	17 (56.7 %)	9 (30.0 %)	21 (70.0 %)	25 (83.3 %)	5 (16.7 %)
<i>p</i> value	0.557		0.130		0.369	
Working District						
Gombak	7 (41.2 %)	10 (58.8%)	7 (41.2 %)	10 (58.8 %)	13 (76.5 %)	4 (23.5 %)
Hulu Langat	6 (35.3 %)	11 (64.7 %)	4 (23.5 %)	13 (76.5 %)	14 (82.4 %)	3 (17.6 %)
Hulu Selangor	7 (30.4 %)	16 (69.6 %)	4 (17.4 %)	19 (82.6 %)	15 (65.2 %)	8 (34.8 %)
Klang	12 (52.2 %)	11 (47.8 %)	8 (34.8 %)	15 (65.2 %)	17 (73.9 %)	6 (26.1 %)
Kuala Langat	9 (69.2 %)	4 (30.8 %)	4 (30.8 %)	9 (69.2 %)	11 (84.6 %)	2 (15.4 %)
Kuala Selangor	5 (45.5 %)	6 (54.5%)	4 (36.4 %)	7 (63.6 %)	8 (72.7 %)	3 (27.3 %)
Petaling	19 (51.4 %)	18 (48.6 %)	11 (29.7 %)	26 (70.3 %)	25 (67.6 %)	12 (32.4 %)
Sabak Bernam	5 (45.5 %)	6 (54.5 %)	4 (36.4 %)	7 (63.6 %)	10 (90.9 %)	1 (9.1%)
Sepang	7 (38.9 %)	11 (61.1 %)	7 (38.9 %)	11 (61.1 %)	13 (72.2 %)	(27.8 %)
<i>p</i> value	0.521		0.834		0.775	
Total	77 (45.3 %)	93 (54.7 %)	53 (31.2 %)	117 (68.8 %)	126 (74.1 %)	44 (25.9%)

to other districts. However, no significant association were found between these variables.

Quality of Life among EHO and AEHO in Selangor during COVID-19

The quality of life of the respondents were determined from mean score of eight domains which include physical functioning, role functioning involving physical, role functioning involving emotional, energy fatigue, emotional well-being, social functioning, pain, and general health. Table IV tabulated the mean score, median, standard deviation, and range of every domain from the survey.

The highest mean score was found at physical functioning domain (80.61) while the lowest mean score was at role functioning related to emotional (40). Other

domains of QoL were at 40 and 64.55. All the mean scores obtained from the study were lower compared to the Malaysian Standard. The greatest difference can be seen in role functioning related to emotional as well as physical which decreased about 39.23 and 38.5 mean score, respectively. The lowest different in mean score was seen at the general health domain (2.18).

Association of Sociodemographic Characteristics with Quality of Life among EHO and AEHO

The association among sociodemographic data with quality of life among respondents were determined using Mann-Whitney U Test for gender and marital status while Kruskal-Wallis H Test for used for the number of children and working district. These tests determined if there were statistically significant differences between two or more groups of independent variables on a

Table VI: Overall respondent's mean score according to eight domains of quality of life

	Mean	Median	Std. dev	Malay- sian Stan- dard	Mean Dif- ferent
Physical Functioning	80.6150	86.3636	15.11642	85.98	5.36
Role Functioning	43.5294	33.3333	46.01790	82.03	38.5
Physical Role functioning	40.0000	.0000	45.37810	79.23	39.23
Emotional Energy Fatigue	52.5735	50.0000	12.00168	66.79	14.22
Emotional Well-being	65.0294	65.0000	9.10974	74.66	9.63
Social Functioning	58.8971	50.0000	19.91282	83.73	24.83
Pain	59.7059	55.0000	20.08640	69.96	10.25
General Health	64.5588	65.0000	10.37518	66.74	2.18

continuous or ordinal dependent variable. The results are shown in Table V.

The mean score of the domains in the male group were statistically significantly higher than the female group with $X^2 = 6.201$, $p = 0.013$ for physical functioning, $X^2 = 9.339$, $p = 0.002$ for energy fatigue, $X^2 = 5.358$, $p = 0.021$ for social functioning and $X^2 = 9.141$, $p = 0.002$ for pain domains. The mean score of the domains in the single group were also statistically significantly higher than the married group with $X^2 = 4.470$, $p=0.035$ for physical functioning, $X^2 = 5.336$, $p=0.021$ for role functioning related to physical, $X^2 = 11.451$, $p=0.001$ for energy fatigue, $X^2 = 11.834$, $p=0.001$ for social functioning and $X^2 = 24.990$, $p=0.001$ for pain.

Lastly, a Kruskal-Wallis H Test showed that there was a statistically significant difference in mean score of domains between respondents having a different number of children. The domains were physical functioning, role functioning related to physical, energy fatigue, social functioning, and pain with the value of $X^2 = 0.002$, $X^2 = 0.008$, $X^2 < 0.001$, $X^2 = 0.013$ and $X^2 < 0.001$, respectively.

Table V: Association of sociodemographic characteristics with quality of life

Domains	Gender		Marital Status		Number of Children		Working District	
	X	df	p-value	X	df	p-value	X	df
Physical Functioning	6.201	1	0.013*	4.470	1	0.035*	17.449	4
Role Functioning	0.323	1	0.570	5.336	1	0.021*	13.804	4
Physical Role Functioning	0.008	1	0.927	1.286	1	0.257	7.278	4
Emotional Energy Fatigue	9.339	1	0.002*	11.451	1	0.001*	20.686	4
Emotional Well-being	0.442	1	0.506	0.036	1	0.850	3.189	4
Social Functioning	5.358	1	0.021*	11.834	1	0.001*	12.607	4
Pain	9.141	1	0.002*	24.990	1	0.001*	26.328	4
General Health	0.016	1	0.901	0.007	1	0.933	9.135	4

*Statistically significant at p-value < 0.05.

Correlation of Depression, Anxiety and Stress with Quality of Life

The correlation of depression, anxiety, and stress with quality of life of the EHO and AEHO were determined through Spearman's Correlation Test. In Table VI, it was indicated that all eight domains of quality of life had a negative correlation with depression, anxiety, and stress. Depression had a statistically negative correlation with all domains of QoL ($p < 0.05$). Anxiety had a statistically negative correlation with all domains of QoL ($p < 0.05$) except for social functioning. Stress had a statistically negative correlation with all domains of QoL ($p < 0.05$) except role functioning (emotional) and pain.

Table VI: Overall respondent's mean score according to eight domains of quality of life

	Mean	Median	Std. dev	Malay- sian Stan- dard	Mean Differ- ent
Physical Functioning	80.6150	86.3636	15.11642	85.98	5.36
Role Functioning	43.5294	33.3333	46.01790	82.03	38.5
Physical Role functioning	40.0000	.0000	45.37810	79.23	39.23
Emotional Energy Fatigue	52.5735	50.0000	12.00168	66.79	14.22
Emotional Well-being	65.0294	65.0000	9.10974	74.66	9.63
Social Functioning	58.8971	50.0000	19.91282	83.73	24.83
Pain	59.7059	55.0000	20.08640	69.96	10.25
General Health	64.5588	65.0000	10.37518	66.74	2.18

DISCUSSION

Association of Sociodemographic Characteristics with Depression, Anxiety and Stress among EHO and AEHO

In general, the highest percentages of psychological distress among EHO and AEHO in Selangor during the pandemic COVID-19 is anxiety (68.8 %), followed by depression (54.7 %) and stress (25.9 %). The findings supported that healthcare workers had higher prevalence of anxiety compared to depression and stress (9,10). Among the factors that increase the chance of getting anxious are due to low self-esteem and perceived stress due to serious problems at work. The factors may also influence the Environmental Health Officer or Assistant Health Officer due to problems that arose at work.

This study also found that stress is associated with marital status. Respondents whom are single can have a likelihood of 86.6 % higher in having stress in comparison with those who are married. Marriage can be a repelling factor against any psychological distress (11). The communication between spouse reduces the chance to suffer from depression, anxiety, and stress. Any communications include expressing their angry or sad feeling to their partner can bring comfort, in turn can avoid from being stress. A study conducted in Hong Kong among healthcare workers supported that people who are single can have a high risk in having stress (12). The finding of the study also found that respondents who has at least a child can have a 6.749 times higher possibility of having stress compared to the respondents that do not have any child though it is not statistically significant. The finding is similar to a previous study

which indicated that parental burnout resulting from parental-related stress are significantly due to the lack of family-functioning (13). This includes demand in extra care for children that have behavioural, emotional, or learning disorders for example autism or hyperactive. In COVID-19 context, increasing demands in parents care can be due to the needs during online teaching and learning at home as the Ministry of Education started to implement online classes as one of the initiatives to lower the COVID-19 cases in Malaysia.

Association of Sociodemographic Characteristics with Quality of Life among EHO and AEHO

The outcomes of the study found that all eight domains of quality of life among EHO and AEHO are lower than Malaysian Standard (8). Role functioning related to emotional has the highest difference, with a mean score of 39.23, followed by role functioning related to physical, which has a mean score of 38.5. Role functioning can be defined as participation in life events such as family life, partner relationships, housework, paid work, studies, social life (including communication with peers), entertainment, community engagement (including volunteering), and everyday living activities (14). The difference in mean score of respondent's qualities of life and the Malaysian Standard could be due to the prominent position of EHO and AEHO especially during the occurrence of COVID-19 pandemic. Overtime work would interrupt the daily routine during the presence of this infectious disease.

Our study found out that social functioning domain is statistically significant with gender, marital status, and the number of children. Individuals' relationships with their surroundings and capability to perform their responsibilities within such environments as job, social activities, and relationships with partners and family are referred to as social functioning (15). According to the result obtained, the possibility to have higher mean score for the domain is higher if the respondents are male. The finding is similar with the study among Italian healthcare workers during COVID-19 pandemic where female workers having higher chances of posttraumatic stress symptoms (PTSS) which then affect their social functioning (16). The study also states that factors that contribute to PTSS are lack of sufficient rest, the workload, and a frequent isolation from family.

The study identified that fatigue was associated with gender. Burnout occurrence among Canadian workers is at the highest between the age of 20 – 35 years old as compared to male group (17). Other than that, a study on psychological fatigue among population in Turkey during COVID-19 unfold that gender was associated to psychological fatigue. The fatigue can be due to the action of avoiding crowded area, keeping social distancing with other people, isolation and treatment of COVID-19 activity and the occupational status of the individuals (18).

Correlation of Depression, Anxiety and Stress with Quality of Life among EHO and AEHO

The association between depression, anxiety, and stress with the eight domains of quality of life are determined through Spearman's Correlation Test. Majority of the eight domains of quality of life significantly have association between depression, anxiety, and stress. Among the number of coefficients that has been tabulated, the greatest distance from zero value of coefficient is -0.358, -0.311 and -0.363 for association of emotional well-being against depression, anxiety, and stress, respectively. The negative value indicated that opposite association occur between emotional well-being and depression, anxiety, and stress. In the other words, the emotional well-being decreases when the level of depression, anxiety and stress are higher.

The balance of feelings (both positive and negative) experiences in life, as well as the perceived emotions (happiness and satisfaction), can be defined as emotional well-being (19). A lower emotional well-being was associated with parenting stress (20). Thus, parents who experience more daily parenting challenges or more important life events report less satisfaction with life, as well as greater negative mood and emotional pain. Stress from daily problems was more strongly linked to emotional well-being than stress from significant life events in which stress from both causes contributes to decreased emotional well-being. A recent study among adolescence in the southeast United States found that self-compassion including perceive stress, depressive symptoms and anxiety are associated with emotional well-being of the individuals (21).

CONCLUSION

The outbreak of COVID-19 in Malaysia has indeed resulted in a variety of negative effects including in altering quality of life, increasing degree of depression, anxiety, and stress for some individuals. The Environmental Health Officer and Assistant Environmental Health Officer were also affected as the working load increased dramatically since the outbreak. This study contributed to the limited literature about depression, anxiety, stress, and quality of life among healthcare workers during the pandemic COVID-19 in Malaysia. The Environmental Health Officer and Assistant Environmental Health Officer were affected by psychological distress from anxiety, followed by depression and stress. However, stress was the only psychological distress to be affected by marital status in which unmarried Environmental Health Officers and Assistant Environmental Health Officers were affected greater than those who are married. The quality of life of the Environmental Health Officer and Assistant Environmental Health Officer affected greater on physical functioning domains during COVID-19 which are lower than the Malaysian Standard. The quality of life is lower in males, those who are single

and those who have children despite of working district. The quality of life of Environmental Health officer and Assistant Environmental Health Officer can be lower due to depression, anxiety, and stress.

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