

## A study of prevalence of burnout among critical care residents at Alexandria main University Hospital

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### ABSTRACT

Burnout syndrome (BOS) has emerged as a prominent job related problem, it encompasses three dimensions; Emotional Exhaustion, Depersonalization and Lack of Self-Accomplishment and critical care medicine as a demanding specialty with heavy duties and emotional challenges, makes critical care residents more prone to burnout, in this study a total of 57 critical care resident physicians were included and burnout was assessed using a paper form questionnaire containing physicians' personal and demographic data, physicians' responsibilities and burnout self-assessment based on Maslach Burnout Inventory (MBI) which was given by hand to critical care residents working in Alexandria main university hospitals over a period of three months. It was found that high level of Emotional Exhaustion, Depersonalization and low level of Self Accomplishment are prevalent among residents with statistically significant association with heavy work-load and ICU duties. It was concluded that current critical care residency program in Alexandria Main University Hospital carries high risk of development of Burnout syndrome and it is recommended to study this phenomenon on a wider scale to identify other possible risk factors, also it is recommended to re-evaluate resident's duties and working hours to minimize the risk of BOS.

**Kew word:** burnout, ICU, residents, Alexandria

### INTRODUCTION

Burnout is defined by Maslach as “a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment that can occur among individuals who do ‘people work’ of some kind”.<sup>(1)</sup> It is described as a crisis in employee’s relationship with work in general and not necessarily as a crisis in his relationship with people at work. The three burnout subscales or dimensions are Emotional exhaustion, Depersonalization (Cynicism), and Lack of self-accomplishment.

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Emotional exhaustion refers to physical and mental fatigue irrespective of its cause. Depersonalization reflects indifference or distant attitude towards clients or customers. Lastly, lack of self-accomplishment encompasses both social and non-social aspects of occupational accomplishment.

Since burnout is a response to the prolonged exposure to occupational stress which negatively affects the individuals providing the service and the organizations where the service is provided, therefore, health care organizations and health care professionals are among the most subjects affected by burnout phenomenon<sup>(2)</sup>.

Intensive care units represent a stressful environment that can lead to burnout syndrome in ICU caregivers. Stress occurs when there is an imbalance between the demands and the resources of the physician<sup>(3)</sup>. Nearly 45% of the medical and nursing staff working in ICUs can be affected by BOS<sup>(4,5)</sup>. Manifestations of BOS affecting ICU caregivers include insomnia, irritability, and depressive symptoms<sup>(4)</sup>, which in turn can affect the quality of the provided care<sup>(6)</sup>. Health care organizations and medical institutions can also be affected by burnout and should target a solution for the problem, as burnout can lead to increased absenteeism and job quitting<sup>(7,8)</sup>, which is a massive crisis having already a shortage in ICU caregivers<sup>(9)</sup>, whereas the training of this highly specialized staff is

costly. Therefore, every effort should be made to outline the magnitude of the problem and its causes.

## MATERIAL AND METHODS

A total of fifty seven residents representing all critical care residents working in Alexandria main university hospitals during a span of 3 months (from December 2016 to February 2017) were enrolled in the study. Each resident was handed a printed specifically designed in-person questionnaire to fill.

The questionnaire was designed to gather personal data and residents' work characteristics and responsibilities. The gathered data include: gender, age, number of ICU beds, number of working hours per shift, number of working hours per week and ICU experience expressed in months. Burnout was measured by the Maslach Burnout Inventory-Human Services Survey (MBI-HSS) which is the most commonly used tool for assessing burnout. It consists of 22 items which are divided into three subscales: emotional exhaustion (the feelings of being emotionally overrun and exhausted by one's work) and it encompasses 7 items, depersonalization (the tendency to view others as objects rather than as feeling persons) and it encompasses 7 items and personal accomplishment (the degree to which a person perceives doing well on worthwhile tasks) and it contains 8 items<sup>(10,11)</sup>. The items are answered in terms of the frequency with which the respondent experiences these feelings, on a 7-point Likert scale ranging from 0 (never) to 6 (every day) scores are calculated for each respondent<sup>(11)</sup>.

A higher score indicates greater burnout except for the personal accomplishment scale which is rated inversely. Specifically, a high degree of burnout is represented by high scores of emotional exhaustion ( $\geq 30$ ) and depersonalization ( $\geq 12$ ) and low scores of personal accomplishment ( $\leq 33$ )<sup>(12)</sup>. Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. After all data was entered into SPSS, they were reviewed for the accuracy of data entry. All the continuous personal and duty characteristics and responsibilities variables were categorized. The three subscale scores of the MBI-HSS were specified as three separate criterion variables. Raw scores of the three subscales were summed and then were transformed into low, moderate or high. Chi-square test was used for categorical variables to compare between different groups and Monte Carlo correction was used as a correction for chi-square when more than 20% of the cells have expected count less than 5. For abnormally quantitative variables, Kruskal Wallis test was used to compare between more than two studied groups, and Post Hoc (Dunn's multiple comparisons test) for pairwise comparisons. A p value of ( $<0.05$ ) was used as the level of significance.

## RESULTS

The study was carried out on 57 critical care residents, 20 of them were females (35.1%) and 37 were males (64.9%) with median age 27 (SD  $\pm 1.28$ ), the

participants were grouped according to number of beds inside their ICU units, number of working hours per shift, number of working hours per week and ICU experience expressed in months as shown in [Table-1](#).

**Table-1. Distribution of the participants according to physician's and ICU data and physician's responsibilities (n=57)**

	No.	%
Male	37	64.9
Female	20	35.1
<b>Age (years)</b>		
Min. – Max.	25.0 – 30.0	
Mean $\pm$ SD.	27.46 $\pm$ 1.28	
Median	27.0	
<b>Experience (months)</b>		
<24	28	49.1
$\geq 24$	29	50.9
Min. – Max.	3.0 – 48.0	
Mean $\pm$ SD.	22.89 $\pm$ 13.43	
Median	24.0	
<b>Number of working hours per week</b>		
<48	13	22.8
$\geq 48$	44	77.2
Min. – Max.	36.0 – 108.0	
Mean $\pm$ SD.	57.16 $\pm$ 13.87	
Median	60.0	
<b>Number of beds</b>		
Min. – Max.	4.0 – 10.0	
Mean $\pm$ SD.	7.68 $\pm$ 1.27	
Median	8.0	
<b>Number of working hours per shift</b>		
12 hour	39	68.0
24 hour	18	31.6
Other	3	5.3

The results according to each dimension of the burnout syndrome were as following: Emotional exhaustion was  $30.19 \pm 7.59$ , Depersonalization was  $21.89 \pm 11.68$  and Job satisfaction was  $33.07 \pm 8.27$ .

High level of Emotional exhaustion was found in 61.4%, while 26.3% showed moderate level of emotional exhaustion and 12.3% showed low level. High level of depersonalization was found in 66.7% of the participants while 24.6% showed moderate level and 8.8% showed low level of depersonalization. Finally, 36.8% of the participants showed low job satisfaction, while 42.1% show moderate level and 21.1% showed high job satisfaction.

Severe form of burnout (defined as high levels of emotional exhaustion and depersonalization and low level of job satisfaction or personal accomplishment) was found in 11 participants representing 19.3%. MBI scores of the participants is distributed as shown in [table-2](#).

**Table-2. Distribution according to MBI scores (n=57)**

	No.	%
<b>Emotional exhaustion</b>		
Low ( $\leq 17$ )	7	12.3
Moderate (18 – 29)	15	26.3
High ( $\geq 30$ )	35	61.4
Min. – Max.	12.0 – 42.0	
Mean $\pm$ SD.	30.19 $\pm$ 7.59	
Median	32.0	
<b>Depersonalization</b>		
Low ( $\leq 5$ )	5	8.8
Moderate (6 – 11)	14	24.6
High ( $\geq 12$ )	38	66.7
Min. – Max.	3.0 – 37.0	
Mean $\pm$ SD.	21.89 $\pm$ 11.68	
Median	25.0	
<b>Personal accomplishment</b>		
Low ( $\leq 33$ )	21	36.8
Moderate (34 – 39)	24	42.1
High ( $\geq 40$ )	12	21.1
Min. – Max.	10.0 – 48.0	
Mean $\pm$ SD.	33.07 $\pm$ 8.27	
Median	35.0	

Maslach Burnout Inventory (MBI) sub-scales were correlated separately with ICU physician's demographical data and responsibilities, regarding Emotional exhaustion, prevalence of high level was found statistically non-significant regarding gender and age. It was found that high level of Emotional exhaustion dimension is higher among participants with ICU experience of less than two years (82.9%) than those who worked in ICU for more than 2 years, but it was not statistically significant ( $^{MC}p = 0.853$ ). Correlation between emotional exhaustion and number of ICU working hours per week (divided into two groups; <48 hours/week group versus >48 hours/week group) revealed significant association between working more than 48 hours/week and high level of emotional exhaustion ( $^{MC}p=0.042$ ) (Figure-1). It was found that high level of emotional exhaustion is associated with working on a 12 hours shift basis rather than 24 hours shift basis and it was statistically significant ( $^{MC}p=0.014$ ), Mean number of beds inside ICU units of the tested sample was 7.57 ( $\pm 0.53$ ), 7.87 ( $\pm 1.06$ ) and 7.63 ( $\pm 1.46$ ) for low, moderate and high level of emotional exhaustion respectively and it has no statistical significance ( $p=0.811$ ) as shown in table-3 and Figure-2.

The second dimension of burnout namely Depersonalization was found non-significant regarding gender and age. High level of depersonalization was found not statistically significant regarding experience although it was higher in those who have been working as intensivists for less than 24 months ( $^{MC}p = 0.289$ ). It was found that 38 participants showed high level of depersonalization, 25 of them (65.8%) was working more than 48 hours per week which is statistically significant ( $\chi^2, p=0.013$ ). Also, high level of depersonalization was found statistically significant among residents who are working on a 12 hours shift basis (i.e. more working days) as compared to residents

who are on the 24 hours shift schedule ( $^{MC}p = 0.001$ ) as shown in table-4.

Regarding the third dimension of burnout; Self accomplishment, it was found that there is no significant difference between males and females ( $p=0.195$ ). Low self-accomplishment was found in 21 participants representing 36.8% of total participants, and it was significantly correlated with younger age group with median age 27 and mean  $26.81 \pm 1.25$  ( $p = 0.009$ ). Among the 21 participants who reported low self-accomplishment; 13 participants had <24 months of experience representing 62%. However, it was not statistically significant ( $p=0.052$ ). It was found that low self-accomplishment was strongly associated with working more than 48 hours per week (median = 60.0) compared to working less than 48 hours per week ( $p=0.001$ ). It was also found that working on 12 hours shift basis is associated with low self-accomplishment compared to 24 hours shift basis ( $p=0.010$ ) as shown in table-5.

Figure-1. Relation between Emotional exhaustion and number of working hours per week

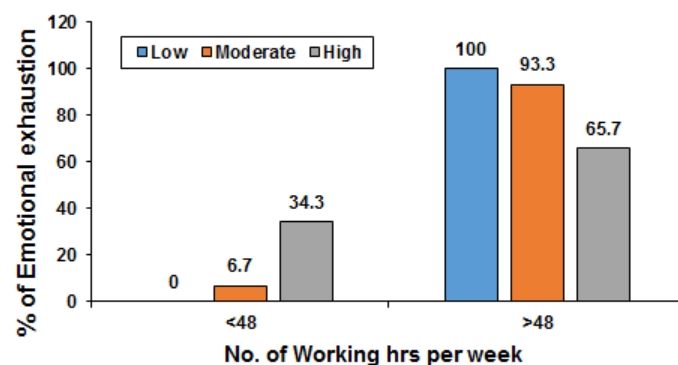
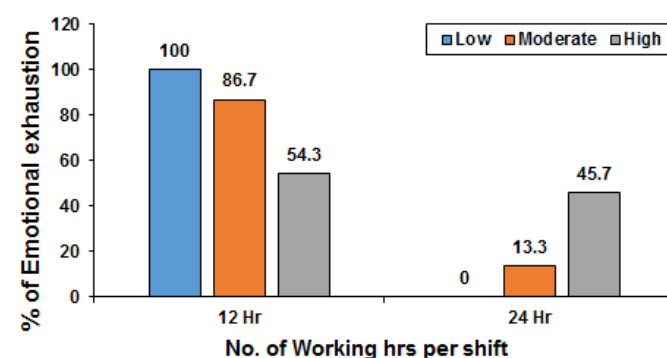


Figure-2. Relation between Emotional exhaustion and number of working hours per shift



## DISCUSSION

This study was carried out to assess the prevalence of professional burnout among critical care residents working in 10 ICU units in Alexandria university hospitals. It is needed to be known that ICU Residents during the first three years of residency are grouped into 3 groups.

**Table-3. Relation between Emotional exhaustion and personal data and resident physician's responsibilities**

	Emotional exhaustion						Test of sig.	p
	Low (≤17) (n=7)		Moderate (18 – 29) (n=15)		High (≥30) (n=35)			
	No.	%	No.	%	No.	%		
<b>Sex</b>								
Male	3	42.9	11	73.3	22	62.9	□ □ □ □ □ □ □ □	MC p=0.409
Female	4	57.1	4	26.7	13	37.1		
<b>Age (years)</b>								
Min. – Max.	27.0 – 30.0		26.0 – 29.0		25.0 – 30.0		F=2.097	0.133
Mean ± SD.	28.14 ± 1.07		27.20 ± 0.94		27.77 ± 1.19			
Median	28.0		27.0		28.0			
<b>Experience (months)</b>								
<24	7	100.0	13	86.7	29	82.9	□ □ □ □ □ □ □ □	MC p=0.853
≥24	0	0.0	2	13.3	9	17.1		
<b>Number of working hours per week</b>								
<48	0	0.0	1	6.7	12	34.3	□ □ □ □ □ □ □ □ □ □	MC p=0.042*
≥48	7	100.0	14	93.3	23	65.7		
<b>Sig. bet. grps</b>	p <sub>1</sub> =1.000,p <sub>2</sub> =0.164,p <sub>3</sub> =0.076							
Min. – Max.	60.0 – 60.0		36.0 – 108.0		36.0 – 84.0		F=2.513	0.090
Mean ± SD.	60.0 ± 0.0		63.07 ± 14.60		54.06 ± 14.21			
Median	60.0		60.0		60.0			
<b>Number of working hours per shift</b>								
12 hour	7	100.0	13	86.7	19	54.3	□ □ □ □ □ □ □ □ □ □	MC p=0.014*
24 hour	0	0.0	2	13.3	16	45.7		
<b>Sig. bet. grps</b>	p <sub>1</sub> =1.000,p <sub>2</sub> =0.033 ,p <sub>3</sub> =0.029							

**Table-4. Relation between Depersonalization and personal data and resident physician's responsibilities**

	Depersonalization						Test of sig.	p
	Low (≤5) (n=5)		Moderate (6 –11) (n=14)		High (≥ 12) (n=38)			
	No.	%	No.	%	No.	%		
<b>Sex</b>								
Male	1	20.0	9	64.3	26	68.4	□ □ □ □ □ □ □ □	MC p=0.126
Female	4	80.0	5	35.7	12	31.6		
<b>Age (years)</b>								
Min. – Max.	27.0 – 30.0		26.0 – 28.0		25.0 – 30.0		F=2.736	0.074
Mean ± SD.	28.0 ± 1.22		27.07 ± 0.73		27.84 ± 1.20			
Median	28.0		27.0		28.0			
<b>Number of working hours per week</b>								
<48	0	0.0	0	0.0	13	34.2	□ □ □ □ □ □ □ □ □	MC p=0.013*
≥48	5	100.0	14	100.0	25	65.8		
<b>Sig. bet. grps</b>	p <sub>1</sub> = - ,p <sub>2</sub> =0.301,p <sub>3</sub> =0.011							
Min. – Max.	60.0 – 60.0		60.0 – 72.0		36.0 – 108.0		F=1.083	0.346
Mean ± SD.	60.0 ± 0.0		61.29 ± 3.47		55.26 ± 16.60			
Median	60.0		60.0		60.0			
<b>Number of working hours per shift</b>								
12 hour	5	100.0	14	100.0	20	52.6	□ □ □ □ □ □ □ □ □	MC p=0.001*
24 hour	0	0.0	0	0.0	18	47.4		
<b>Sig. bet. grps</b>	p <sub>1</sub> = - ,p <sub>2</sub> =0.064,p <sub>3</sub> =0.001							

**Table-5. Relation between Self accomplishment and personal data and resident physician's responsibilities**

	Low (≤33) (n=21)		Moderate (34 – 39) (n=24)		High (≥ 40) (n=12)		Test of sig.	p
	No.	%	No.	%	No.	%		
<b>Sex</b>								
Male	10	47.6	16	66.7	10	83.3	□□	0.111
Female	11	52.4	8	33.3	2	16.7	□□□□□	
<b>Age (years)</b>								
Min. – Max.	25.0 – 29.0		26.0 – 29.0		26.0 – 30.0			
Mean ± SD.	27.19 ± 1.08		27.71 ± 0.91		28.42 ± 1.31		F=5.104*	0.009*
Median	27.0		28.0		28.50			
<b>Sig. bet. grps</b>	p <sub>1</sub> =0.109, p <sub>2</sub> =0.002, p <sub>3</sub> =0.065							
<b>Hospital</b>								
AMUH	20	95.2	22	91.7	12	100.0	□□□□□□□	MC p=0.792
Other	1	4.8	2	8.3	0	0.0		
<b>Number of working hours per week</b>								
<48	2	9.5	3	12.5	8	66.7	□□	MC p=0.001*
≥48	19	90.5	21	87.5	4	33.3	□□□□□□□	
<b>Sig. bet. grps</b>	p <sub>1</sub> =1.000, p <sub>2</sub> =0.001, p <sub>3</sub> =0.002*							
Min. – Max.	36.0 – 108.0		36.0 – 84.0		36.0 – 60.0			
Mean ± SD.	62.0 ± 13.86		59.50 ± 10.81		44.0 ± 11.82		F=9.043*	<0.001*
Median	60.0		60.0		36.0			
<b>Sig. bet. grps</b>	p <sub>1</sub> =0.497, p <sub>2</sub> <0.001, p <sub>3</sub> =0.001*							
<b>Number of working hours per shift</b>								
12 hour	17	81.0	18	75.0	4	33.3	□□□□□□□	MC p=0.022*
24 hour	4	19.0	6	25.0	8	66.7		
<b>Sig. bet. grps</b>	p <sub>1</sub> =0.729, p <sub>2</sub> =0.010, p <sub>3</sub> =0.029*							

Residents of each group rotate every month on different ICU units with a fixed weekly schedule for each group, and each resident has to work a duty of five 12 hours shifts per week i.e, 60 hours per week. However, the number of working hours for residents in the last two years of residency is reduced to 36 hours per week. Also it is needed to mention that some ICU units, especially units outside the main university hospital, are based on 24 hours shifts schedule. Such variable duty conditions made us question their relation to prevalence of professional burnout among residents.

Given the lack of consensus about the measurement of burnout and lack of valid cut-off values despite that most definitions are based on the Maslach burnout inventory scale, several definitions of severe burnout were adopted by different authors. For example, Embriaco et al.<sup>(5)</sup> calculated an MBI score and defined severe BOS as a score (> -9)<sup>(6)</sup>, which artificially increases the prevalence of BOS, whereas Mion et al.<sup>(13)</sup> defined BOS as severe impairment of one of the three dimensions. While Malaquin considered BOS to be severe when the three dimensions are affected, which probably selected the most severe cases of BOS<sup>(14)</sup>. In our study we considered severe burnout is present when the participant has high scores of emotional exhaustion (≥30), high scores of depersonalization (≥12) and low

scores of personal accomplishment (≤33), accordingly the percentage of severe burnout among residents was 19.3% (11 residents out of 57). This is considered a high percentage compared to a similar study that took place in Yemen in 2007<sup>(15)</sup> on 563 working physicians, where only 66 participants marked high scores in the 3 sub-scales of MBI representing 11.7% of the participating physicians.

Regarding each dimension of burnout syndrome, reported rates among physicians are highly variable with 46% to 80% reporting moderate to high levels of emotional exhaustion, 22% to 93% reporting moderate to high levels of depersonalization and 16% to 79% reporting low to moderate levels of personal accomplishment<sup>(16)</sup>.

In our study, high level of emotional exhaustion (≥30 is considered high) was present in 61.4% of the participants, high level of depersonalization (a score ≥12 is considered high) was observed in 66.7% of the participating intensivists, and low level of personal accomplishment (this subscale has an inverse relationship to burnout, and a score ≤33 is considered low) was found in 36.8% of the 57 intensivists who participated in the survey. Although the sample size is relatively small but these rates are considered extremely high compared to rates of burnout sub-scales in similar studies that were carried out on ICU professionals. For example, Teixeira et al<sup>(17)</sup> found thae the

rates of burnout sub-scales namely, high emotional exhaustion, high depersonalization and low personal accomplishment were 33%, 27% and 23% respectively among ICU professionals in state hospitals in Portugal. In a study done by Cubrilo-Turek et al<sup>(18)</sup> on 41 physicians working in medical ICU in a general hospital in Croatia, moderate degree of Emotional exhaustion with mean score (24.9±11.2), Depersonalization with mean score (6.0±5.6) and Personal accomplishment (34.4±8.8) was found among the medical ICU staff. Guntupalli and Fromm<sup>(19)</sup> tested the prevalence of burnout among 248 intensivists who were members of the Internal Medicine Section of the Society of Critical Care Medicine, high level of Emotional exhaustion was found in 29% of the respondents, while 20.4% of them scored high in Depersonalization.

In our study, we found that gender, age and ICU experience are not significant variables as risk factors for burnout which is consistent with a review of 11 studies on resident burnout in 2004 by Thomas<sup>(20)</sup>, and consistent with results of Guntupalli et al study on 212 ICU professionals in 2014<sup>(21)</sup>. However low personal accomplishment was significant among younger age group which may be explained by the fact that young and newly assigned ICU residents have high expectations which usually fade when they face the not as expected reality and eventually lead to low self-esteem and lack of personal accomplishment.

Concerning ICU duties and workload, we found that working more than 48 hours and working on 12 hours shift schedule (which means more working and less off days) are significantly associated with the three dimensions of burnout. Workload of critical care residents is physically and emotionally demanding, with limited rest, sleep deprivation and stress related to dealing with critical patients. In a French survey by Embriaco et al, high level of burnout was reported among participants who had more number of shifts per month<sup>(5)</sup>. In a study by Gopal et al in 2003, he founded that reduction of residents' working hours may not only reduces burnout, but also can improve learning and quality of care<sup>(22,28,29)</sup>.

The high percentage of Burnout among Alexandria University hospitals ICU residents may explain the crisis that have occurred recently in the department of critical care due to shortage of residents and increased absenteeism and vacations for issues related to health problems, also may explain the departure of a number of ICU trainees before the end of their training program. It is understandable that the nature of critical care as a specialty dealing with the most critical patients, most serious diseases and the most dangerous infections, also the ICU environment itself with the loud alarms and sophisticated devices can lead to emotional and physical disturbances and eventually burnout, but such high percentage must be an alarm and worth due attention. It is important to mention that seeking the ICU professionals' welfare and satisfaction has become a key component of the quality of healthcare system<sup>(23)</sup>.

Prevention of BOS constitutes a real challenge and many authors have tried to find solutions to reduce the prevalence and consequences of BOS: well-being programs for residents in training, coping management workshops and teaching about the recognition of

burnout<sup>(24-27)</sup>. These measures appear to be effective, but larger studies are needed to confirm this trend. Proposed solutions to enhance wellbeing at work include more frequent meetings as well as relaxation workshops in order to improve overall communication. Improvement of work organization, especially work schedules, overtime payment and recovery of the hours worked are also proposed solutions.

This study has a number of limitations. It was a single-centre study, the sample size was limited. The study was mainly addressing the prevalence of burnout and aiming at figuring out the magnitude of the problem. Further studies on a wider scale are needed to determine other possible risk factors beyond personal factors and factors related to ICU working duties.

## CONCLUSION

This study revealed a significant high percentage of burnout among critical care resident physicians working at Alexandria Main University hospitals compared to their counterparts from different regions in the world and this high percentage is mostly associated with heavy duties and work-load.

## Recommendations:

We recommend further studies of other possible risk factors that may cause resident burnout, also we recommend re-evaluation of residency program in an attempt to reach a work schedule that allow the resident to learn and carry out his duties properly assuring his welfare.

## Conflict of Interests

Authors declare that there is no conflict of interests regarding the publication of this paper.

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