studies, including white noise, exposure to cold temperature, loud noises and anticipation of stressful situations such as giving a speech. Overall, these stressors result in acute stressful situations. Other studies screened for subjects who experience a prolonged stressful situation such as being primary caregiver to a terminal loved one.

It has been shown that subjects who have been exposed to prolonged life stressors are more likely to complain of symptoms of GERD. One study demonstrated a correlation between discussion of emotionally charged topics and nonpropulsive activity in the esophagus. Another study assessed gastric acid output in relation to personality traits. It was found that subjects who were considered to have a higher level of impulsivity and expressed emotions more freely were more likely to react with an increase in gastric acid output when subjected to stress simulated by a problem-solving session than patients with low level of impulsivity. In fact, subjects with low level of impulsivity reacted to this stress with a decrease in gastric acid secretion. Increased gastric acid secretion has been seen in subjects with a higher tendency towards emotional lability. One study evaluated the relationship among stress, psychological traits associated with chronic anxiety, acid reflux parameters and perceptions of reflux symptoms. The researchers found that stress tasks did not influence objective measurements of acid reflux (total acid exposure, number of acid reflux events and duration of longest acid reflux event). Another significant finding was that reflux patients who were chronically anxious and exposed to prolonged stressful stimuli may be more likely to perceive low-intensity esophageal stimuli as painful reflux symptoms. Therefore, even normal esophageal acid exposure could trigger complaints of GERD symptoms. Also, it is not a specific psychiatric disorder that may be responsible for gastrointestinal distress but the presence of psychological distress that predisposed a patient to have clinical manifestations of GERD.

A study by Naliboff et al. found that ‘vital exhaustion’, which is a measure of sustained stress symptoms, was most closely correlated with symptoms of heartburn. Fass et al. have shown that acute auditory stress can exacerbate heartburn symptoms in GERD patients by enhancing perceptual response to intra-oesophageal acid exposure. This greater perceptual response is associated with greater emotional responses to the stressor.

EFFECTS OF STRESS ON BEHAVIOUR AND SLEEP

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Psychologists Yerkes and Dodson described already in 1908 the inverted-U shaped relationship between arousal and performance. When the level of arousal heightens, behavioural performance increases but only to a certain point. When the level of arousal, produced by stress, becomes too high, adequacy of behaviour decreases while sleep is affected. Physical and mental performance generally follows the level of circulating stress hormones, in particular the glucocorticoid hormone cortisol. The secretion of cortisol in response to a stressful event triggers a chain of events, ultimately leading to energy for fight-or-flight behaviour. Under non-stressed basal conditions, the level of cortisol follows a circadian pattern: a maximum in the morning, necessary for daily activities, with slowly declining levels during the day, and a trough during sleep. Cortisol binds to two glucocorticoid receptor subtypes: Type I with a high affinity and Type II with a lower affinity for cortisol. There are also differences in brain location between the types. The differences between the two subtypes results in a discrepancy of receptor occupation. During the nocturnal sleep trough all Type I receptors are occupied by the endogenous hormone, while during the morning wake peak Type 1 receptors are fully saturated and Type 2 receptors come into action. The mix of Type I and Type II occupation is also the situation by stressful events. The differential qualities