Giora Pillar, MD, PhD
Professor, Faculty of Medicine
Technion – Israel Institute of Technology
Sleep Laboratory
Rambam Medical Center,
Haifa 31096, ISRAEL
Tel: 972-4-8542646
Fax: 972-4-8542441

Open label prospective study to assess the efficacy of the wake promoting beverage "Push" on vigilance and function of healthy volunteers in the morning and in the evening.

Correspondence:

Giora Pillar, MD, PhD,

Sleep Lab

Rambam Medical Center and Technion Faculty of Medicine

8 Haaliya St.

Haifa 31096

Israel.

Phone: 97248542646

Fax: 97248542441

e-mail: gpillar@tx.technion.ac.il

Abstract

Daytime somnolence results in huge burden on health and function. Numerous studies have shown that daytime sleepiness results in increased rate of accidents, poor function, reduced creativity and productivity at work, and increased health care utilization. Previous studies have shown that the herbs-based wake promoting drink Wake-Up (PUSH) following lunch (either once or during daily usage for 30 days) resulted in substantial improvement in alertness and function. In studies so far, volunteers have drank one bottle of the beverage (100cc) after lunch. The purpose of the current study was to examine whether this vigilance and performance improvement remains or changes when participants drink 2 bottles per day: one in the morning and one in the afternoon/evening. Fifteen healthy volunteers (8 females) were recruited for the study. All were tested twice in the same day: once in the morning and once in the evening. Each time, they underwent a battery of tests prior to and 30 minutes following drinking 1 bottle (100cc) of PUSH. The battery of tests consisted of measurements of vital signs, blood pressure, and validated commonly used standard function and vigilance tests such as an immediate word recall test (iWRT, short term memory), digit symbol substitution test (DSST, concentration), and subjective rating (on a visual analogue scale - VAS) of their vigilance, ability to focus, and effectiveness at work. The mean age height and weight of the participants were 39 years, 169cm, and 72Kg, respectively. In the morning, statistically significant improvement in all subjective measures was observed following drinking of PUSH (vigilance, ability to focus, and effectiveness at work), and in the objective DSST. Drinking PUSH in the morning resulted in a trend (albeit not statistically significant) improvement in iWRT. In the evening, only DSST demonstrated a significant improvement following drinking of PUSH, but there was a trend of improvement in iWRT and in subjective measures of vigilance, ability to focus, and effectiveness at work. Similarly to previous studies, results consistently show that drinking PUSH is associated with a 4-7% improvement in objective measures of alertness, and with 6-22% improvement in subjective measures.

Background:

Daytime somnolence is a very common phenomenon, affecting all ages and both genders. It may occur occasionally, commonly, or even chronically, due to a variety of etiologies. It may result in consequences such as road or work accidents, reduced function, diminished creativity and productivity at work, and increased health care utilization. Treatment of daytime somnolence may consist of changes in lifestyle, improving quality of nocturnal sleep, increasing the duration of nocturnal sleep, drinking wake promoting beverages or stimulant medications.

Drinking coffee may improve vigilance and function by blocking adenosine receptors and by inhibiting phospho-di-esterase (PDE) which results in increased cAMP and adrenergic activity. However, caffeine has a relatively short half-life and potential side effects (such as increased pulse rate and blood pressure). Moreover, regular coffee drinking results in tolerance and substantial reduction of the wake promoting effects.

The recently developed beverage PUSH (Altman Ltd, Israel, formerly called Wake-Up) is a wake promoting drink based on herbal ingredients consisting of extracts of Ginkgo Biloba, guarna, elderberry and fruit-up. Guaraná (Paullinia cupana) seeds have a long history of usage as a stimulant by Amazonian tribes. It has been previously shown that Guarana improves memory performance and mood, and increases alertness, even in relatively low doses. The Ginkgo Biloba is a unique tree which can be found predominantly in China. Extract of Gincko Biloba are believed to have some important healing properties, and are used in herbal medicine for asthma,

bronchitis, fatigue, and tinnintus. On top of its' vigilance promoting, it has been shown to have favorable effects on memory. It is currently being used predominantly in Asia as a preventive treatment for Alzheimer's disease and other types of dementia. Elderberry extract may improve the immune function, and the fruit-up adds to the "Push" beverage predominantly taste, although its' glucose content may also improve alertness.
Previous studies have shown that Wake-Up (PUSH) beverage following lunch resulted in substantial improvement in alertness and function. This has initially been shown as a single dose effect in a double blind study compared to caffeine and placebo, and in a later study the same effects remained after 30 days of daily usage (once daily after lunch). In studies so far, volunteers have drank only one bottle of the beverage (100cc) per day, in which case tolerance did not develop.

Aim:

The purpose of the current study was to examine whether PUSH beverage improves vigilance and performance subjectively and objectively when drank twice in the same day: one in the morning and one in the afternoon/evening. We expected that similar improvements as were observed after lunch will be observed in different times of the day as well.

Methods:

The study was proved by the institutional review board (IRB, Helsinki committee) of Rambam Medical Center and all participants have signed an informed consent prior to participation. Fifteen healthy volunteers (8 females) were studied twice in the same day: once in the morning and once in the evening. In each visit (morning and evening) they underwent a battery of tests prior to and 30 minutes following drinking 1 bottle (100cc) of PUSH. The battery of tests consisted of measurements of vital signs, blood pressure, and validated commonly used standard function and vigilance tests such as an immediate word recall test (iWRT, short term memory), digit symbol substitution test (DSST, concentration), and subjective rating (on a visual analogue scale - VAS) of their vigilance, ability to focus, and effectiveness at work. The results before drinking the beverage were compared to the results following it, utilizing t-test. $p<0.05$ was considered statistically significant

Results:

The mean age of the participants was 39±10 years (range 24-56 years).They were all non-obese with an average height and weight of 169cm and 72Kg, respectively. The various measures of their tests prior to and following PUSH, in the morning and in the evening, are presented in the two tables below. In the morning, statistically significant improvement in all subjective measures was observed following drinking of PUSH (vigilance, ability to focus, and effectiveness at work), and in the objective DSST. Drinking PUSH in the morning resulted in a trend (albeit not statistically significant) improvement in iWRT. In the evening, only DSST demonstrated a significant improvement following drinking of PUSH, but there was a trend of improvement in iWRT and in subjective measures of vigilance, ability to focus, and effectiveness at work. Similarly to previous studies, results consistently show that drinking PUSH is associated with a 4-7% improvement in objective measures of alertness, and with 6-22% improvement in subjective measures.

Morning tests (on the average 08:38±00:58)

Test	Before drink	30min after drink	P	Change (%) from BL after 30min
Pulse	77±9	77±10	NS	1
Systolic BP	115±16	116±17	NS	1
Diastolic BP	76±10	74±10	NS	-2.5
iWRT, correct	9.5±2.6	9.9±3.1	NS	4.2
DSST	84±17	91±18	0.001	8.7
Vigilance	6.5±2.3	7.5±1.8	0.03	15
Focusing	6.4±2.1	7.8±1.6	0.001	22
Effectiveness	7.4±1.8	8.2±1.6	0.013	11

Evening tests (on the average 18:34±01:34)

Test	Before drink	30min after drink	P	Change (%) from BL after 30min
Pulse	81±10	80±11	NS	-0.6
Systolic BP	119±19	122±21	NS	1.8
Diastolic BP	75±12	75±11	NS	-0.1
iWRT, correct	8.0±3.5	9.1±3.9	0.06	13
DSST	86±17	92±17	0.001	6.6
Vigilance	6.8±1.4	7.5±1.7	NS	11
Focusing	6.5±1.7	7.5±1.6	0.07	16
Effectiveness	7.4±1.5	7.8±1.6	NS	6

Discussion:

The current study shows that both during the morning hours and the evening hours there is a substantial wake promoting effect of PUSH beverage, with improvement in both objective performance and subjective perception of alertness. The magnitude of improvement following drinking PUSH in the morning ranged between 4-9% in objective measures, and 11-22% in subjective ones, while during the evening the improvement ranged between 7-13% in objective measures, and 6-16% in subjective ones. The variability of performance was higher in the evening and thus some of the measures resulted in trend of improvement, without statistical significance. Nevertheless, an order of around 10% improvement in alertness and performance following drinking push is a relatively stable and steady finding, repeated over several different studies. The current study initially shows that the improvement is observed not only following lunch but also during morning and evening hours, and similar improvement when drank twice in the same day. In the current study, in accordance with previous studies, there were no adverse effects in drinking PUSH. Hemodynamic measures (heart rate and blood pressure) were not affected by PUSH both in the morning and in the evening. Thus, as was observed in previous studies, PUSH results in improved alertness without adverse hemodynamic effects.
The major limitation of the current study is the relatively small sample size of 15 participants, all healthy. This probably explains the lack of statistical significance in some measures.
Nevertheless, there is ongoing trend demonstrating the wake promoting effects of this herb-based beverage. These effects seem to not be dependent on the time of drinking, and are not limited to only one bottle per day.

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