Energy Drinks Consumption in Male Construction Workers, Chonburi Province

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This unmatched case-control study aimed to determine the relationship among caffeine drinks consumption known as "energy drinks consumption", drug dependence and related factors in male construction workers in Chonburi Province. It was conducted during December 15, 2001 and February 15, 2002. Data were collected using interview questionnaires. The logistic regression was used to control possible confounding factors. The subjects consisted of 186 cases who had consumed energy drinks for more than 3 months and 186 controls who had given up for more than 3 months. They were frequency/group matched by age group. There was statistically significant association among energy drinks consumption and overtime work, motivation from advertisements, positive attitude of energy drinks consumption, alcohol drinks, smoking and ex-taking Kratom behavior. Multivariate analyses revealed that only 5 factors were related to energy drinks consumption: marital status (OR = 1.88, 95%CI: 1.14, 3.11), overtime work (OR = 2.84, 95%CI: 1.73, 4.64), motivation from advertisements (OR = 2.72, 95%CI: 1.67, 4.42), positive attitude of energy drinks consumption (OR = 4.06, 95%CI: 1.65, 10.01) and ex-taking Kratom behavior (OR = 2.77, 95%CI: 1.19, 6.44). As a result, construction workers should be provided with the knowledge of energy drinks consumption, the effect of drug dependence behavior, and the advantages of safe and healthy food that is cheap, readily available, and rich in nutrients.

Keywords : *Energy drinks consumption, Male construction workers*

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Energy drinks (caffeine drinks) have long been available in the Japanese market and have been registered as both food and drug. They were imported from Japan to Thailand in 1965 and at first were classified as drug. After that they have been classified as one kind of food so that the government could impose a higher tax on such products. At present, there are approximately 80 brand names of energy drinks, which have been registered as specially controlled food according to the Ministry of Public Health Notification Number 62[1] under Food Act[2]. McEvoy and Gerald, 1990[3] reported that prolonged and high intake of caffeine may produce tolerance, habituation and psychological dependence. Such physical signs of withdrawal as headaches, nervousness, anxiety and dizziness have also manifested. The severity of these symptoms may increase when a higher quantity of caffeine is taken. In 1991, the Ministry of Public Health (MOPH) made recommendations under the Food Act that the upper limit of caffeine in energy drinks must not exceed 50 mg per bottle and that the manufacturers must label some warnings with respect to the adverse effects of caffeine on their product packages[1]. The important pharmacological action of caffeine is the central nervous system (CNS) stimulant at a dose of 100-200 mg. Although, Thailand has a high economic growth, the income of laborers, particularly construction workers, does not keep pace with the ever-increasing costs of living due to an uneven income distribu-

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tion[4]. As a result, they need to work overtime in order to earn more money. The popularity of energy drinks has grown in parallel with the need to work overtime. Laborers, guards, truck drivers and construction workers are among those who commonly consume energy drinks. The prevalence of energy drinks consumption among construction workers was explored and reported that 0.9-9.6%, 22.3-82.7%, 37.3-77.7% of the participants drank every day, some days and do not drink, respectively[4].

To reduce the level of caffeine consumption, it is necessary to determine the factors related to the behavior of energy drinks consumption. The present study, therefore, aimed to obtain more information regarding such factors in order to shed light on the determinants of energy drinks consumption.

Material and Method

The study population was composed of 372 male construction workers. The subjects consisted of 186 cases who had consumed energy drinks for more than 3 months and 186 controls who had given up for more than 3 months. All of them were frequency/group matched by age group. Their age was over 13 years old and they had worked on construction jobs for more than 3 months at a construction site in Chonburi Province. They are willing to participate in the present study. Cronbach's alpha coefficient was used to assess the reliability of the questionnaires of knowledge and attitude towards energy drinks. After the pre-test, Cronbach's alpha coefficient was 0.70 and 0.72 respectively. The researcher trained 10 research assistants to interview the study subjects. Data collection was conducted during 15th December, 2001 and 15th February, 2002. The interviewing started after work from 6.00 pm to 8.00 pm at the construction site. The sample size was calculated by using the following formula[5].

$$n = \frac{\left\{Z_{\alpha/2}\sqrt{2P(1-P)} + Z_{\beta}\sqrt{P_1(1-P_1)+P_o(1-P_o)}\right\}^2}{(P_1-P_o)^2}$$

When P_o = proportion of energy drinks consumption knowledge among controls = 0.61, P_1 = proportion of energy drinks consumption knowledge among cases = 0.77, $Z_{\alpha/2}$ = 1.96 at α = 0.05, Z_{β} = 1.28 at β = 0.10, $P = (P_1+P_o)/2$= 0.69., the calculated sample size in each group was at least 169.

Demographic and other characteristics of the study subjects were presented by frequency, percentages, means, median and standard deviation.

- Bivariate analyses were chi-square test, odds ratio, and 95% confidence interval.

- Multivariate analysis was multiple logistic regression

Results

The largest age group was 25-44 years (58.60%). Almost one fourth was in the age group 15-24 years (23.10%) of both groups. Age range was 15-65 years. Most of them were farmers and came from the Northeastern region (case group 65.10%, control group 71.00%), married (63.40% of case group and 72.60% of control group), attended primary school (74.20% of case group and 73.70% of control group). The majority of both case and control group had a family income lower than 7,000 baht/month (60.20% of case group and 75.80% of control group). Highest current occupations were carpenter (45.20% of case group and 48.40% of control group), most favorite media information was television (90.30% of case group, 91.90% of control group), watched in the evening (79.00% of case group, 77.40% of control group). The main reason for still consuming was to increase their energy (58.60%), which 43.00% of the reason was to prevent drowsiness and 20.40% of the reason was for good taste. The range of consumption was among 4 months and 20 years, the largest group had consumed for more than 5 years (53.20%), and 1-4 years (34.90%). The range of the amount of consumption was 4-168 bottles per month. The mean of consumption was 29.84 bottles/month (SD = 26.69) and the mean of expense was 310 baht/month (SD = 282.58), ranging from 40 to 1,680 baht/month. Bivariate analyses demonstrated that all demographic variables had no statistical association with energy drinks consumption, with the exception of motivation from advertising, current alcohol drinking and current tobacco smoking (Table 1). The variables which related to energy drinks consumption were initially examined and identified as risk factors. They were included in the final models to control the confounding effect by multiple logistic regression model. The multivariate analyses indicated that 5 variables (marital status, overtime work, motivation from advertising, positive attitude towards the energy drinks consumption and ex-taking Kratom behavior) had a significant association with the energy drinks consumption as shown in Table 2.

Discussion

Using multiple logistic regression after adjusting for all variables found a significant association among 5 risk factors and energy drinks consumption. Marital status, single men consumed energy

Table 1. The association between interested variables and energy drinks consumption by univariate analyses

Variables	Cases		Controls		CrudeOR	95% CI	p-value*
	n	%	n	%			
Marital status							
Single	68	36.60	51	27.40	1.53	0.98-2.37	0.075
Married/Divorced/Widowed**	118	63.40	135	72.60	1.00		
Education							
No-schooling	59	2.70	3	1.60	2.12	0.41-10.88	0.438
Primary	138	74.20	137	73.70	1.28	0.56- 2.93	0.702
Secondary	32	17.20	32	17.20	1.27	0.50- 3.22	0.785
High school**	11	5.90	14	7.50	1.00		
Occupation							
Bricklayer	46	24.70	32	17.20	2.20	0.99-4.87	0.760
Carpenter	84	45.20	90	48.40	1.43	0.70-2.93	0.420
Others	41	22.00	41	22.00	1.53	0.70-3.35	0.380
Laborer**	15	8.10	23	12.40	1.00		
Work status							
Permanent	120	64.50	107	57.50	1.34	0.88-2.04	0.202
Temporary**	66	35.50	49	42.50	1.00		
Information from advertising							
Radio	8	4.30	13	7.00	0.68	0.23-1.99	0.666
Television	159	85.50	152	81.70	1.17	0.61-2.27	0.763
Others**	19	10.20	21	11.20	1.00		
The media of energy drinks most frequently seen							
Radio	9	4.80	3	1.60	4.00	0.84-19.16	0.155
Television	168	90.30	171	91.90	1.33	0.54- 3.23	0.691
Others**	9	4.90	12	6.50	1.00		
The media of energy drinks with the best impression							
Radio	13	7.00	10	5.40	2.97	0.88-9.98	0.137
Television	166	89.20	160	86.00	2.37	0.95-5.92	0.092
Others**	7	3.80	16	8.60	1.00		
Motivation from advertising							
Yes	140	75.30	100	53.80	2.62	1.69-4.07	0.001[a]
No**	46	24.70	86	46.20	1.00		
Usefulness of message from advertising							
Yes	166	89.20	154	82.80	1.73	0.95-3.14	0.100
No**	20	10.80	32	17.20	1.00		
Alcohol drink							
Ex-drink***	20	10.80	22	11.80	1.18	0.75-4.14	0.277
Current drink	150	80.60	133	71.50	2.19	1.14-4.17	0.024[a]
None**	16	8.60	31	16.70	1.00		
Tobacco smoking							
Ex-smoking***	15	8.10	13	7.00	2.11	0.86-5.18	0.160
Current smoking	148	79.60	131	70.40	2.06	1.18-3.61	0.015[a]
None**	23	12.40	42	22.60	1.00		

* p-value of chi-square, ** base-line group, *** It referred to who used but gave up now, [a] significant (p-value < 0.05)

drinks more often than married men (1.88 times). Single men had fewer expenses than married men. They could spend on extravagant and unhealthy products that were similar to the previous studies[6,7]. Overtime work, they need energy drinks for extra work because they believed that it could prevent them feeling drowsy and increased freshy. Furthermore, their attitude towards the products certainly had an influence on their products decision making. If they had a positive attitude (increased energy etc.), their decision making can be made more easily than those who had a negative attitude, even if the products were expensive[8]. Association was found in positive attitude workers which corresponded with the previous study[2]. They consumed more products than those with a negative attitude (4.06 times). The result agreed with the previous study[9]. Kratom ex-addicts, the workers who had stopped taking Kratom for more than 3 months had drunk ener-

Table 2. The relationship between variables and energy drinks consumption by multiple logistic regression

Variables	Crude		Adjusted*		p-value
	OR	95% CI	OR	95% CI	
Marital status					
Single	1.53	0.98-2.37	1.88	1.14-3.11	0.014[a]
Married/Divorced/Widowed	1.00		1.00		
Overtime work					
Yes	2.29	1.51-3.47	2.84	1.73-4.64	<0.001[a]
No	1.00		1.00		
Motivation from advertising					
Yes	2.62	1.69-4.07	2.72	1.67-4.42	<0.001[a]
No	1.00		1.00		
Attitude towards energy drinks consumption					
Positive	4.08	1.73-9.59	4.06	1.65-10.01	0.002[a]
Moderate	1.36	0.89-2.09	1.51	0.93- 2.47	0.097
Negative	1.00		1.00		
Kratom behavior					
Taking	7.95	0.97-65.33	6.87	0.79-59.78	0.081
Ex-taking	3.03	1.37- 6.71	2.77	1.19- 6.44	0.018[a]
None	1.00		1.00		

* Adjusted for work status, health status and disease, [a] significant (p-value < 0.05)

gy products more than who were not addicts (2.77 times). They believed that the effect of Kratom dependence could make them work longer. Because it became active within a few minutes and the effect lasted several hours. Accordingly, they felt happy, strong and active. Those are their reasons to consume the products after stop taking Kratom. The motivation of advertising, the workers who accepted advertising motivation consumed the products more often than those who did not (2.72 times). Due to the market competition, the companies used exaggerated promotion and advertisement through the mass media. As a result, the consumers might have believed the advertisement.

Positive attitude towards the products: It was found that the consumption of those who had positive attitude increased a lot. Furthermore, after consuming the drink, they believed that it could increase their energy and they would make more money from overtime. This attitude was incorrect. In fact, sugar is an important ingredient of the products that creates energy for living creatures. However, the limitation of the present study, was subjects were collected only from construction sites in Muang district which may not be representative of all male construction workers in Chonburi Province.

At present, however, the manufacturers try to avoid the regulations which are recommended by the Food and Drug Administration (FDA). There is a measure of punishment but it has not been strictly enacted. Therefore, the consumers are still misled by in appropriate advertising.

Conclusion

Caffeine drinks are widely consumed among construction workers who believe that it could give them more energy and make them alert. Therefore, they call it "Energy drink". In fact, energy drinks usually contain caffeine, sugar, vitamins and other substances such as taurine, inositol, glucoronolactone, etc. These substances are widely contained in a normal daily diet [(10)]. It is known that construction workers are persons who have low incomes and some of them accumulatively pay large amounts of money for energy drinks. Therefore it would be reasonable if they use their money to buy other kinds of food which are cheaper, safer and rich in nutrients. At present, energy drinks have a high cost of trade and are distributed to many countries around the world. Due to the large benefits, the companies get more competition in marketing. The companies show the wrong image of brave and good-looking which are presented by workers' favorite movie stars or singers to promote and to report exaggerated advertisement through mass media especially television. As a result, the consumers might be mislead by the advertised suggestion.

Clearing attitude, controlling advertisements, warning of prolonged and high consumption effects, protection among teenage workers from the wrong attitude, misleading the usefulness of the products, including advice on alcohol and the disadvantages of

addictive substances are the strongest recommendation from the study.

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การบริโภคเครื่องดื่มให้พลังงานในคนงานก่อสร้างชาย จังหวัดชลบุรี

ณัฐจาพร พิชัยณรงค์, วิศิษฏ์ ฉวีพจน์กำจร, ปัทมา ขอบจิต, วิโรจน์ วีรชัย, ดุสิต สุจิรารัตน์

การวิจัยแบบ Unmatched Case-Control นี้ มีวัตถุประสงค์เพื่อค้นหาปัจจัยที่มีผลต่อการบริโภคเครื่องดื่มผสมคาเฟอีน ซึ่งรู้จักกันในนาม "เครื่องดื่มให้พลังงาน" รวมทั้งการใช้สารเสพติดในกลุ่มคนงานก่อสร้างชาย จังหวัดชลบุรี ระหว่างวันที่ 15 ธันวาคม พ.ศ. 2544 ถึง วันที่ 15 กุมภาพันธ์ พ.ศ. 2545 ข้อมูลได้จากการสัมภาษณ์ การวิเคราะห์ข้อมูลใช้สมการถดถอยลอจิสติกเชิงพหุในการควบคุมตัวแปรกวน ใช้กลุ่มศึกษาจำนวน 186 คน ซึ่งเป็นผู้ที่บริโภคเครื่องดื่มผสมคาเฟอีนไม่น้อยกว่า 3 เดือน และกลุ่มควบคุมจำนวน 186 คน ซึ่งเป็นผู้ที่ไม่เคยบริโภคเครื่องดื่มดังกล่าว หรือเคยบริโภคแต่ปัจจุบันเลิกบริโภคมาไม่น้อยกว่า 3 เดือน โดยควบคุมอายุให้มีสัดส่วนเหมือนกัน (frequency/group matching) ผลการศึกษาพบว่า การทำงานล่วงเวลา แรงจูงใจจากโฆษณา ทัศนคติทางบวกต่อเครื่องดื่มให้พลังงาน การบริโภคเครื่องดื่มผสมแอลกอฮอล์ การสูบบุหรี่ และการเสพสารเสพติดประเภทกระท่อมในอดีต มีความสัมพันธ์กับการบริโภคเครื่องดื่มให้พลังงาน จากสมการถดถอยลอจิสติกเชิงพหุ พบว่า มีปัจจัยเพียง 5 ปัจจัยที่มีความสัมพันธ์กับการบริโภคเครื่องดื่มให้พลังงาน นั่นคือสถานภาพสมรส (OR = 1.88, 95%CI: 1.14, 3.11) การทำงานล่วงเวลา (OR = 2.84, 95%CI: 1.73, 4.64) แรงจูงใจจากโฆษณา (OR = 2.72, 95%CI: 1.67, 4.42) ทัศนคติทางบวก (OR = 4.06, 95%CI: 1.65, 10.01) และการใช้สารเสพติดประเภทกระท่อมในอดีต (OR = 2.77, 95%CI: 1.19, 6.44) จึงเห็นว่า ควรให้ความรู้ที่ถูกต้องแก่คนงานก่อสร้างในเรื่องของการบริโภคเครื่องดื่มให้พลังงาน แนะนำอาหารที่ปลอดภัยและมีประโยชน์ต่อร่างกาย มีคุณค่าทางโภชนาการ สามารถหาได้ง่ายในท้องถิ่น และมีราคาถูก และให้ความรู้ในเรื่องของสารเสพติดประเภทต่าง ๆ รวมทั้งโทษที่มีต่อร่างกาย
