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Health Promoting Lifestyles and Related Factors in Pregnant Women

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Background: The purpose of this study was to explore health promoting lifestyles and related factors in pregnant women.

Methods: This was a descriptive study using convenience sampling. Altogether, 172 pregnant women were recruited from a medical center in southern Taiwan. Personal data was collected, and the instruments used included perceived health status, self-efficacy of health behaviors, perception of family or peers' health-promoting behaviors, and Health Promoting Lifestyle Profile (HPLP Π).

Results: The results showed that the standardized total score of health promoting lifestyles was 66.88 (moderate level). The subscales of the HPLP Π in descending order of standardized scores were as follows: "interpersonal relationships," "health responsibility," "psychological wellness," "nutrition," "stress management" and "physical activity." There were significant differences in the total scores of the HPLP Π among subjects with different educational level, socioeconomic status, chronic diseases, exercise habits, length of sleep, and perceived health status. Both perception of health-promoting behaviors among family (or peers) and self-efficacy of health behaviors had significantly positive relationships with health-promoting lifestyles. Perception of the family or peers' health-promoting behaviors, self-efficacy of health behaviors, perceived health status and chronic diseases were the four significant predictors of health-promoting lifestyles, accounting for 62.4% of the variance.

Conclusion: The findings of this study could be used as a reference for prenatal care, nursing education, and maternal / neonatal health policies.

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Key words: pregnant women, health promotion, self-efficacy, health status

Two important factors inducing ten major causes of death reported by the United States Department of Health and Human Services, accounting for 50% of related factors, are unhealthy behaviors and lifestyles. They greatly affect people's health in daily life.[1,2] "Healthy People 2010" is a set of health objectives which the United States Department of Health and Human Services initiated

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in 2000. It was designed to achieve two overarching goals: to "increase the quality of life and a healthy life" and "eliminate health disparities among different races and ethnic people".[3] The Japanese government also designed achievable goals in "Healthy Japan 21" for health promotion and disease prevention in the twenty-first century to promote longevity and a good quality of life.[4] Regardless of nationality and ethnicity, therefore, improving national health is an international tendency.[5,6]

The international birth rate is decreasing annually,[7] and this is particularly obvious in Taiwan. From 1995 to 2005, the birth rate decreased from 15.5‰ to 9.1‰.[8] Health issues for both mother and fetus are more significant when the population is decreasing. Research indicates that unhealthy behaviors or lifestyles, such as smoking, drinking alcohol and drug abuse, may endanger the health of both the mother and fetus (e.g. carcinogens and low birth weight).[9,10] Women experience many significant biological events and transitions through their lifespan, such as pregnancy and breast-feeding. These roles related to the above events and transitions force them to show more regard for the health of other family members and take more responsibility for it. Therefore, it is much more important for pregnant women to show healthy lifestyles, and the exploration of health promotion by women and their family members is significant.[11] Although some studies related to health promoting lifestyles of pregnant women have been published in Western countries, there is still a lack of data in Taiwan. Hence, the purpose of this study was to explore health promoting lifestyles and related factors for pregnant women in Taiwan. We could apply these findings to health education for prenatal care, nursing counseling, and popularizing national health policies for women and children. The health status of mother and fetus also could be promoted by encouraging pregnant women to concern and change their lifestyles with regard to health promotion.

Literature review

Health promoting lifestyles and self-efficacy of health behavior

Health promoting lifestyles are "viewed as a multi-dimensional pattern of self-initiated actions and perceptions that serve to maintain or enhance the level of wellness, self-actualization, and fulfillment of the individual".[1] These included six domains, individual nutrition, physical activity, stress management, interpersonal relationship, psychological wellness and health responsibility.[12] Belloc and Breslow further pointed out that there are seven health behaviors which influence personal health status, not smoking,[13] having no or little alcohol intake, having breakfast, not eating junk food, keeping an ideal body weight, sleeping for 7-8 hours a day, and having exercising adequately. Pender indicated that the determining factors of health promoting lifestyles or behaviors could be distinguished into "cognitive-perceptive factors" and "modifying factors."[14] Cognitive-perceptive factors include realization of the importance of health, a personal definition of health, perceived self-efficiency, and perceived health status. Modifying factors indirectly affect health promoting behaviors through their influence on cognitive-perceptive factors. These include personal characteristics, friendships, and factors related to situation and behaviors.[14] Many studies have found that perceived health status affects health promotion behaviors of individuals[12,15] and that health status is one of the important predictors of health promoting lifestyles.[2,16]

The concept of self-efficacy is receiving increasing recognition as a predictor of health behavior change and maintenance.[17] Grembowski et. al. also found that self-efficacy is highly correlated with health behaviors.[18] Bandura argued that behaviors are affected by the individual's expectation of efficacy and outcome.[19] When individuals are self-assessed as having high self-efficacy, they will enthusiastically participate in health behaviors or lifestyles and thus improve their ability to have healthy behaviors.[12,20,21] On the contrary, if they are assessed with low self-efficacy, the individual will escape from activities which might inspire their potentials.[19,21] Ralf and Britta indicated that health specific self-efficacy is a person's optimistic self-belief about being capable to resist temptations and to adopt a healthy lifestyle.[22] Callaghan also revealed that the more positive the self-care behaviors and self-efficacy of health promotion, the better the self-care strategy.[23] Hung and Kao further suggested that health promoting behaviors should include recreation and exercise,[21] adequate nutrition, health responsibilities, self-duty and social support. Wang et al. pointed out that the health and happiness

of the individual would be improved if he/she could adopt healthy behaviors,[2] such as having a regular, adequate diet, exercising and undergoing health examinations.

Health promoting lifestyles and pregnant women

Wang reported that physical changes during pregnancy include nausea, dizziness, increasing respiratory rates, back pain and body image changes.[24] The psychological process includes mimicry, role play, fantasy, acceptance and grief. Pregnancy often prompts women and their families to reflect on or to try to alter some particular behaviors. This may be influenced by (1) a women's feelings and health, such as stopping smoking because of nausea; (2) social pressures to alter unhealthy behaviors because of the negative perceived impact on fetal health; and (3) advice which increases internal motivators to benefit their baby's health through health-related lifestyle behavior change.[25] Rubin argued that pregnant women need to achieve four maternal tasks,[26] "seeking and ensuring safe passage through pregnancy and childbirth," "binding-in to the child," "acceptance by others," and "giving of oneself." The most important task is "seeking and ensuring safe passage through pregnancy and childbirth." Thus, it is very significant for pregnant women to have health promoting lifestyles in delivering a healthy baby.

The American College of Obstetricians and Gynecologists (ACOG) indicated that pregnant women should exercise based on their physical condition, and stop when they feel tired. Regular exercise could help pregnant women have a smoother labor and delivery, and improve the compensatory functions of mothers' physiological systems as pressure increases.[27] It is recommended that pregnant women exercise for at least 30 minutes per day, such as fixed bicycling and swimming, but intensive forms of exercise, such as diving and water-skiing, are not recommended.[27,28] Downs and Hausenblas found that there were correlations among exercise during pregnancy, reduced depression, elevated self-esteem, body image and control of increasing body weight.[28] Reilly further indicated that there are no risks of premature or low birth weight for women exercising during pregnancy.[29]

Viau et al. pointed out that major health lifestyle changes in pregnant women include reducing intake of caffeine and restriction of smoking, drinking, and substance abuse.[30] Tong et al. reported that harmful health behaviors affect the health promoting life state.[31] Many reports also indicated that these unhealthy behaviors can cause low birth weight.[10,32,33] Stacy et al. further revealed that smoking could cause premature births and sudden infant death syndrome (SIDS),[33] and increase the rate of spontaneous abortion (miscarriage). Excessive alcohol intake could lead to fetal alcohol syndrome (FAS), and then to intra-uterine growth retardation (IUGR), central nervous system (CNS) problems, and mental retardation of the fetus.[10] Hence, it would be helpful to promote mother-infant health with a healthy lifestyle and avoid an unhealthy lifestyle during pregnancy.

Research related to pregnant women's health promoting lifestyles

There is little research directly related to health promotion during pregnancy. In Western countries, Viau et al. found that "maintaining maternal and fetal well-being" was still the main consideration for pregnant women.[30] About 86% of pregnant women had a variety of health-maintaining behaviors for daily nutrition intake, daily activities, and sleeping patterns. They also restricted toxic substances, and modified exercise or daily work to adapt to physiological changes during pregnancy. Higgin, Frank and Brown revealed that over 49% of women change their diet and exercise patterns, smoking habits,[34] and vitamin and alcohol intake because of pregnancy. About 71% change their exercise routine to walking.

In addition, Viau et al. indicated that health promoting lifestyles during pregnancy are affected by age,[30] marital status, and economic status. This would be more obvious for women who are older, married, and have a better economic status. Adams, Bowden, Humphrey, and McAdams further indicated that pregnant women who recognize and receive social support (e.g., perceived family or peers' health-promoting behaviors) develop better health habits and behaviors.[35] Another study also suggested that if women perceive more social support they have more healthy behaviors and will be more likely to change unhealthy lifestyles.[25]

In Taiwan, there is no published research related to this issue. Some studies have focused on health promotion which is not relevant to pregnancy. For

example, Huang revealed that the lowest two variables for college students' health-promoting lifestyles are health responsibility and exercise.[15] The predictors of health promoting lifestyles were self-efficacy of health, health concept, sex and perceived health status, accounting for 50.4% of the variance. Wang et al. found positive correlations among perceived health status ($r = 0.22$, $p < .05$), social support ($r = 0.26$, $p < .01$), and health promotion for patients with chronic diseases.[2] The predictors of health-promoting lifestyles included perceived health status, condition of disease control, and social support, accounting for 26.4% of the variance. Chung found that there were positive correlations among self-efficacy of health behaviors ($r = 0.79$, $p < .001$), perception of health-promoting behaviors among family (or peers) ($r = 0.61$, $p < .001$), and health promoting lifestyles for elderly diabetes mellitus patients; those were also significant predictors of health promoting lifestyles, accounting for 64.8% of the variance.[12]

In summary, the potential related factors for pregnant women's health-promoting lifestyles include personal characteristics (such as age and socio-economic status), health behaviors (e.g., exercising), perceived health status, self-efficacy of health behaviors, and perception of family or peers' health promoting behaviors (a kind of social support) based on the available literature (Fig. 1).

Research questions in this study

The research questions in this study include (1) What are the relationships between personal characteristics, perception of family or peers' health promoting behaviors, self-efficacy of health behavior and health promoting lifestyles in pregnant women? (2) What are the predictors of health promoting lifestyles in pregnant women?

METHODS

Design and participants

A cross-sectional research design with convenience sampling was used to recruit pregnant women for our study. Participants were recruited from a hospital-based private prenatal clinic of a medical center in southern Taiwan in 2006. Inclusion criteria were an age at least 18 years and ability to read and write Chinese. Hospitalized and non-Chinese women were excluded to avoid factors concerning different cultur-

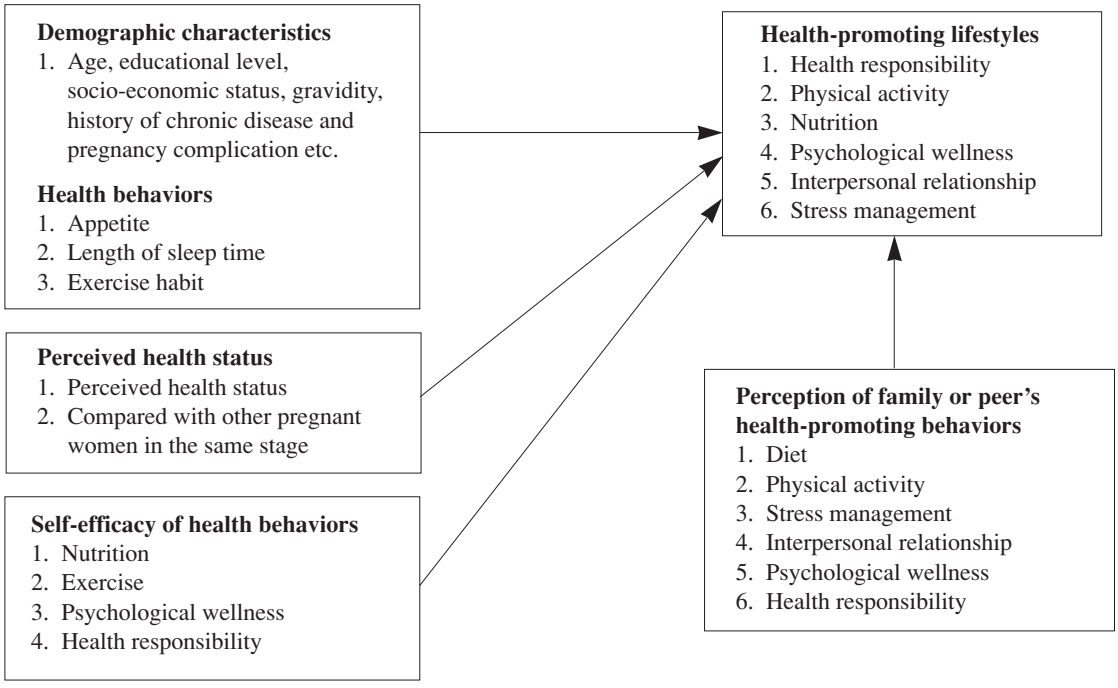

Fig. 1 The related factors of pregnant women's health-promoting lifestyles.

al backgrounds and to reduce confounding factors. To meet the requirement of statistical power at 0.8 under $\alpha = 0.05$, a minimum of 144 subjects was collected. This calculation was based on the correlation coefficients (*r)* of the bivariate correlations between Perceived Health Status, Self-efficacy of Health Behaviors, Perception of Family or Peers' Health Promoting Behaviors, and Health Promoting Lifestyles in previous research ($r = .24$ - $.79$).[12]

Measurements

Personal data included age, educational level, gravidity, and health behaviors (Fig. 1). Socio-economic status was assessed based on the "social class evaluation scale" developed by Chuang.[36] The status was divided into 5 levels according to educational level and occupation; a lower level indicates higher status.

Health Promoting Lifestyle Profile (HPLP Π)

The health promoting lifestyle profile 2nd edition (HPLP Π) was originally developed by Walker, Sechrist and Pender.[37] The 52-item profile measures self-reported daily activities over six subscales, "nutrition," "physical activity," "stress management," "interpersonal relationships," "psychological wellness," and "health responsibility," rated on a 4-point Likert scale, ranging from 1 (never) to 4 (always). HPLP Π scores range from 52 to 208; higher scores indicate better health-promoting lifestyles. Cronbach's α for the HPLP Π total scale was .96 and that of the internal consistency for the subscales ranged from .79 to .87. The test-retest reliability at two weeks was .89.[34] Cronbach's α for the Chinese version of the HPLP Π was .91 and for each subscale ranged from .55 to .89. Factor analysis of the HPLP Π Chinese version revealed that four factors accounted for 43.17% of the variance.[12] In the current study, the wording for some statements on the Chinese version of HPLP Π was modified and the number of examples was increased for more clarity.[12] For example, the 10th item was "intense exercise over 20 minutes at least three times a week" and the 16th item was "mild to moderate exercise over 30 to 40 minutes at least five times a week" in the original HPLP Π. The word "intense" was deleted because intense exercise would not be appropriate for participants. In order to distinguish it from the 10th item, the 16th item was modified to "do physical activities to an appropriate, comfortable degree for over 20 to 30 minutes such as taking a walk, yoga, and swimming." Cronbach's α for this study was .96 and that for each subscale ranged from .77 to .87. The content validity index (CVI) was .90 and six factors accounted for 54.41% of the variance.

Perception of family or peers' health promoting behaviors profile (PFHPBP)

The PFHPBP was developed by Chung based on the "perception of family or peers' health promoting behaviors scale." The Cronbach's α was .92.[12] The 18-item profile measures participants' perceptions of their family (or peers) regarding health behaviors over six subscales, "diet," "physical activity," "stress management," "interpersonal relationships," "psychological wellness," and "health responsibility." Each item is scored on a 4-point Likert scale, ranging from 1 (nobody) to 4 (everybody), scores range from 18 to 72; the higher the score, the better the perception of family or peers' health-promoting behaviors. Cronbach's α for this study was .91 and that for each subscale ranged from .71 to .87. The CVI was .92 and six factors accounted for 76.38% of the variance.

Self-efficacy of health behaviors (SEHB)

The SEHB is adopted from Chung and the Cronbach's α is .90.[12] The 25-item scale measures the self-reported degree of confidence in doing health-promoting behaviors over 4 subscales, "nutrition," "exercise," "psychological wellness," and "health responsibility." Each item is scored on a 4-point Likert scale, ranging from 1 (no confidence) to 4 (over 75% confidence). The SEHB scores range from 25 to 100; higher scores indicate better self-efficacy of health behaviors. Cronbach's α for this study was .95 and that for each subscale ranged from .86 to .92. The CVI was .91 and four factors accounted for 68.07% of the variance.

Procedures

After obtaining the approval of the Institute Review Board and the hospital, the researcher explained the purpose of this study to potential participants while they were waiting for a prenatal visit. After participants gave written consent, they was administered the questionnaire within 20 minutes. They received a gift as appreciation after completion.

Data analysis

The Statistical Package for the Social Sciences (SPSS, SPSS Inc., Chicago, IL, U.S.A.), release version 10.0, was used for data analysis. Descriptive statistics were used to show subject data. One-way ANOVA and the t-test were employed to test the differences among health-promoting lifestyles and personal data, such as education and pregnancy complications. Pearson's product-moment correlation was applied to examine the bivariate relationships among the four key variables. Stepwise multiple regression analysis was then used to determine the significant predictors which contributed to health-promoting lifestyles in Taiwanese pregnant women.

RESULTS

Personal characteristics and perceived health status

Two hundred pregnant women were initially recruited, and 28 of these were excluded because of incomplete data, giving a response rate of 86%. The average age of the 172 pregnant women in this study was 30.28 (SD = 4.24). Most were under 35 years old (n = 144, 83.72%) with college degrees (n = 66, 38.37%). Of these, 34.88% (n = 60) had level III socio-economic status. A large number (n = 76, 44.19%) were in the third trimester of pregnancy. About 45.35% (n = 78) were primigravidas. More than half (n = 100, 58.14%) lived with a spouse. Most had no history of chronic diseases (n = 159, 92.44%) maternal complications (n = 167, 97.09%), premature delivery (n = 167, 97.09%) or abortion (n = 140, 81.40%) (Table 1).

A large number (n = 78, 45.35%) of participants enjoyed improved appetites and had 4 to 6 meals per day (n = 147, 85.47%). Most (n = 75, 43.60%) perceived their sleeping hours to have increased. More than half slept 6 to 8 hours (n = 102, 59.30%) per day. Forty-four pregnant women (25.58%) exercised regularly, but most subjects did not (n = 128, 74.42%). Twenty-one of these 44 (47.72%) exercised once a day and 16 (36.36%) every two or three days; the duration of exercise was most often less than 30 minutes (n = 36, 81.82%). Most of the pregnant women (n = 113, 65.70%) perceived their health status as "almost the same" (n = 108, 62.79%) as others (Table 2).

Table 1. Personal Data and Health-promoting Lifestyle Profile Scores (N = 172)

Variable	n	Mean ± SD	*p*
Age			
20-24	13	132.31 ± 16.48	.333
25-29	67	136.61 ± 22.90	
30-34	64	142.11 ± 22.34	
35 and above	28	141.39 ± 24.30	
Educational level			
Senior high school and below	32	46.75 ± 9.19	< .001‡
Junior college	58	49.21 ± 7.29	
University and above	82	50.85 ± 7.27	
Socio-economic status			
Level II and below	44	143.70 ± 21.62	.018*
Level III	60	137.70 ± 19.95	
Level IV	42	143.24 ± 21.98	
Level V	26	127.92 ± 27.28	
Resident condition			
Lives with a spouse	100	140.46 ± 24.43	.652
Lives with a spouse and relatives	65	137.15 ± 19.48	
Others	7	138.00 ± 23.15	
Gestational age			
First trimester (Less than 17 weeks)	35	142.14 ± 22.45	.483
Second trimester (17-28 weeks)	61	136.57 ± 21.13	
Third trimester (29-40 weeks)	76	139.75 ± 23.76	
Gravidity			
First pregnancy	78	139.53 ± 22.21	.956
Second pregnancy	66	138.45 ± 22.37	
Third pregnancy or more	28	139.50 ± 24.69	
History of preterm delivery			
Yes	5	146.60 ± 32.52	.453
No	167	138.89 ± 22.29	
History of miscarriage			
Yes	32	139.56 ±25.11	.926
No	140	139.15 ± 21.92	
Maternal complications in this pregnancy			
Yes	5	140.00 ± 22.27	.938
No	167	139.20 ± 22.65	
History of chronic diseases			
Yes	13	121.92 ± 25.59	.004†
No	159	140.52 ± 21.79	

*: $p < .05$; †: $p < .01$; ‡: $p < .001$.

Table 2. Perceived Health Status, Health Behaviors and Health-promoting Lifestyle Profile Scores (N = 172)

Variable	n	Mean ±SD	*p*	LSD posthoc
Perceived health status				
Compared with others				
Worse	27	137.19 ±22.84	.255	
Better	37	144.54 ±21.94		
Almost the same	108	137.73 ±22.62		
More uncomfortable than others				
Yes	47	135.72 ±22.52	.313	
No	49	142.73 ±24.11		
Almost the same	76	138.87 ±21.48		
Perceived health status				
Good	46	150.26 ±23.46	< .001‡	1 > 2 > 3
Common	113	135.13 ±20.92		
Bad	13	134.23 ±21.25		
Health behaviors				
Appetite				
Increased	78	142.03 ±23.59	.296	
Decreasde	35	137.46 ±25.02		
No change	59	136.24 ±19.31		
Length of sleep time				
Increased	75	141.37 ±20.59	.030*	1, 2 > 3
Decreased	29	145.69 ±25.06		
Almost the same	68	133.81 ±22.69		
Exercises regularly				
Yes	44	146.91 ±27.26	.007†	1 > 2
No	128	136.43 ±20.13		

*: $p < .05$; †: $p < .01$; ‡: $p < .001$.

Relationships between personal data, perceived health status and health promoting lifestyles

The results of one-way ANOVA and t-test to examinal group differences for personal characteristics and health-promoting lifestyles indicated significant differences between health-promoting lifestyles and educational level ($F_{2,169} = 8.03$; $p < .001$), socio-economic status ($F_{3,168} = 3.43$; $p < .05$), and presence of chronic diseases ($t_{170} = -2.92$; $p < .01$). Posthoc analysis using least significant difference (LSD) testing revealed that the education group of university and above had significantly higher scores than those of senior high school and below ($p < .05$); the level Π and IV socio-economic groups had significantly higher scores than those of level V ($p < .01$); the group with non-chronic diseases had significantly higher scores than those with chronic diseases ($p < .01$) (Table 1).

In addition, there were significant differences among health-promoting lifestyle scores and length of sleep time ($p < .05$), regular exercise ($p < .01$), and perceived health status ($p < .01$). The LSD revealed significant differences in health-promoting lifestyles between pregnant women with increasing or decreasing lengths of sleep time and those with no difference ($p < .05$); and pregnant women who exercised regularly also had higher scores than those who did not ($p < .01$) (Table 2).

Relationships between perception of family or Peers' health promoting behaviors, self-efficacy of health behaviors and health promoting lifestyles

Pearson's correlation analysis revealed that perception of health-promoting behaviors among family (or peers) was positively associated with health-promoting lifestyles. For the subscales, psychological wellness had the highest correlation with health-promoting lifestyles ($r = .60$, $p < .001$), and physical activity the lowest ($r = .32$, $p < 0.001$). In other words, pregnant women who perceived psychological wellness in their family (or peers) as being more positive have better health-promoting lifestyles. When they perceived that their family or peers had much physical activity, women had better health-promoting lifestyles. Self-efficacy of health behaviors was also positively associated with health-promoting lifestyles. For the subscales, psychological wellness had the highest correlation with health-promoting lifestyles ($r = .64$, $p < .001$), and physical activity the lowest ($r = .49$, $p < .001$); the higher the competence for performing health behaviors, the greater the frequency of health-promoting lifestyles (Table 3).

Predictors of health promoting lifestyles for pregnant women

Results of stepwise multiple regression analysis revealed that 62.4% of the variance ($p < .001$) in health-promoting lifestyles during pregnancy was explained by a combination of four predictors, perception of family or peers' health-promoting behav-

Table 3. Pearson's Correlation Coefficient among Perception of Family or Peers' Health-promoting Behaviors, Self-efficacy of Health Behaviors and Health-promoting Lifestyle Profile (N = 172)

Variables	Health-promoting lifestyles							
	TP	95% CI	HR	PA	Nutrition	PW	IR	SM
Perception of family or peers'								
Health-promoting behaviors								
Total profile (TP)	.67‡	0.58-0.75	.58‡	.44‡	.52‡	.62‡	.59‡	.59‡
–Health responsibility (HR)	.51‡	0.39-0.61	.46‡	.47‡	.35‡	.42‡	.36‡	.48‡
–Physical activity (PA)	.32‡	0.18-0.45	.15*	.44‡	.18*	.25†	.21‡	.39‡
–Nutrition	.56‡	0.45-0.65	.52‡	.32‡	.58‡	.50‡	.45‡	.40‡
–Psychological wellness (PW)	.60‡	0.49-0.69	.49‡	.33‡	.46‡	.63‡	.55‡	.54‡
–Interpersonal relationship (IR)	.46‡	0.33-0.57	.43‡	.10	.35‡	.50‡	.62‡	.34‡
–Stress management (SM)	.56‡	0.45-0.65	.55‡	.27‡	.41‡	.53‡	.52‡	.51‡
Self-efficacy of health behaviors								
Total profile	.67‡	0.58-0.75	.54‡	.48‡	.51‡	.63‡	.60‡	.57‡
–Health responsibility	.50‡	0.38-0.60	.51‡	.24‡	.41‡	.50‡	.49‡	.36‡
–Physical activity	.49‡	0.37-0.60	.32‡	.57‡	.27‡	.43‡	.37‡	.45‡
–Nutrition	.60‡	0.49-0.69	.51‡	.37‡	.60‡	.54‡	.48‡	.48‡
–Psychological wellness	.64‡	0.54-0.72	.50‡	.34‡	.42‡	.65‡	.67‡	.60‡

*: $p < .05$; †: $p < .01$; ‡: $p < .001$.

iors, self-efficacy of health behaviors, perceived health status, and a history of chronic diseases (Table 4). This indicated that the pregnant women had a greater frequency of health-promoting lifestyles if they perceived a better health status, had no history of chronic diseases, perceived more health-promoting behaviors by family or peers, and had higher competence in performing health behaviors.

Table 4. Stepwise Multiple Regression Analysis of Pregnant Women's Health-promoting Lifestyles

Variables	*B*	Adjusted R^2 with variable add	*p*
Perception of family or peers' health-promoting behaviors	1.269	.447	.000
Self-efficacy of health behaviors	.708	.576	.000
Perceived health status*	–7.474	.609	.000
History of chronic diseases	11.154	.624	.000
Constant	13.83		

*: Lower scores indicate better health status.

DISCUSSION

Using a correlational, cross-sectional research design with convenience sampling in 172 pregnant women, we found that the combined influences on health-promoting lifestyles from a combination of four predictors were higher than the impact of any single predictor by itself. The four predictors of health promoting lifestyles-- perception of family or peers' health-promoting behaviors, self-efficacy of health behaviors, perceived health status and chronic diseases-- explained 62.4% of the variance in health promoting lifestyles during pregnancy. Compared with the previous studies of Huang and Chiou,[38] as well as Wang,[11] our study had a higher percentage of explained variance, indicating that the four predictors described above are more effective in predicting the health promoting lifestyles of pregnant women. Huang and Chiou's study of female college students revealed predictors of self-efficacy of health behaviors, health concept and sex, which accounted for

49.8% of explained variance.[38] Wang et al.'s study of women's health promoting behaviors revealed that the predictors were dignity, external power-related health control, perceived health status, age and socio-economic status, accounting for 23% of the variance.[11] In addition, our study found that the presence of chronic diseases was an important predictor and could serve evidence-based data for clinical practice and research in the future. However, it is difficult to compare the variable "chronic disease" for health promoting lifestyles because no related research has been published. In brief, the four predictors of pregnant women's health promoting lifestyles found in this research could be important references on prenatal care for health professionals.

The findings of this study revealed that pregnant women with a higher educational level, a better socio-economic status, a better perception of financial condition, and no chronic diseases were found to have greater abilities of having health promoting lifestyles. This is similar to Wang et al.'s study of women in which higher socio-economic status indicated more health promoting behaviors.[11] Our study also supports previous findings that patients with a higher educational level and chronic diseases had better health promoting lifestyles.[2] In this study, pregnant women with reduced sleeping hours had higher health promoting lifestyle scores than others. One possible reason is that most of the participants of this study were employed, and being pregnant often prompts women to reflect on or to try to alter some particular behaviors, such as increasing their motivation to benefit their baby's health through lifestyle behavior changes.[25] Therefore, they may need to spend time on their career or health promotion behaviors instead of resting, which would lead to 'reduced sleeping hours' and a better health promoting lifestyle. In addition, pregnant women who exercised regularly had more positive health promoting lifestyles. This is consistent with Hung's study,[39] in which pregnant women who exercised maintained mother-infant health and had a better quality of life during pregnancy. It also supports the recommendations of the ACOG, which indicated that it is safe for pregnant women with no maternal complications or medical problems to exercise at least 30 minutes per day.[27] There was a positive relationship between perceived health status and health promoting lifestyles noted by many previous researchers.[2,12,17,40]

Furthermore, "perception of family or peers' health-promoting behaviors" was positively associated with health-promoting lifestyles, indicating that the health-promoting behaviors of pregnant women are related to their family or peers' health-promoting behaviors in their daily lives. This is consistent with the statements of Pan, Chu, Lin, Chang, and Lee that individuals' behaviors are affected by family and friends.[41] This is also similar to the work of Adams et al.[35] in which pregnant women who perceived and received social support developed better health habits and behaviors. Croghan also suggested that if women perceive more social support they will have more healthy behaviors and will be more likely to change unhealthy lifestyles.[25] Therefore, we should consider family members and peers when encouraging healthy lifestyles during pregnancy. We could not only achieve the goal of mother-infant health but also reach the ideal situation of family, and finally, national health.

In this study, there was a positive correlation between self-efficacy of health behaviors and health-promoting lifestyles, indicating that pregnant women who had more competence in performing health behaviors had a greater frequency of health promoting lifestyles. Callaghan also found that health-promoting self-care behaviors, perceived self-efficacy of self-care and methods of self-care were all correlated.[23] This is in agreement with the work of Croghan.[25] Therefore, health professionals should provide an appropriate health education to pregnant women to increase their competence in performing health behaviors. After improving their self-efficacy ability, pregnant women would have greater competence in health-promoting behaviors.

Conclusions and recommendations

It is important that nursing professionals actively assist pregnant women to achieve high levels of health.[42] The results of this research revealed that educational level, socio-economic status, self-perceived health status, health behaviors, self-efficacy of health behaviors, and perception of family or peers' health-promoting behaviors are related to health-promoting lifestyles. There is no doubt that health promotion could improve the ability to control and promote health, especially in pregnancy. Among the four predictors described above, the strongest effect on health promotion was perception of family

or peers' health promoting behaviors, accounting for 45.1% of the variance (Table 4). The results of this research also revealed that the highest standardized score was for "interpersonal relationships" among the six dimensions of both health-promoting lifestyles and perception of family or peers' health-promoting behaviors. Additionally, family and peers also could affect health-promoting lifestyles in pregnant women. Therefore, utilization of the support system of family and peers for pregnant women should be emphasized to assist in health-promoting lifestyles, and achieve national health.

Among these six dimensions, "physical activity" had the lowest standardized scores, indicating that pregnant women might dislike exercising during pregnancy. This is similar to a previous study in Taiwan of female college students who did not have sufficient exercise behaviors.[15] In light of the findings of this study and previous studies, Taiwanese women may not be enthusiastic about exercise and may not exercise regularly. If young students do not have appropriate perspectives and do not exercise regularly, it will be hard to promote exercise in the future. On the other hand, if they can physically tolerate it, pregnant women should be encouraged to do mild or moderate exercise for 30 minutes three times a week. If they don't exercise, health professionals could discuss the reasons with them, determine any problems, and design an exercise plan, including an exercise schedule, discussion time and recordings for each prenatal visit. Solving problems and assisting in determining what kinds of exercise they prefer, could be included in the perinatal examination routine.

This study draws attention to related factors in pregnant women's health promoting lifestyles in Taiwan, which are different from other healthy people and those with chronic diseases. We recommend a longitudinal study to explore health promoting lifestyles during different trimesters. Continued research exploring why Taiwanese pregnant women are not willing to exercise regularly based on the findings of this study (74.42% of the pregnant women did not exercise) can contribute to both policy-making and mother-infant health. A possible limitation of this study was the use of a cross-sectional study design and a convenience sample. Therefore, the findings of this study can not be generalized to the entire population of pregnant women in Taiwan.

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懷孕婦女健康促進生活型態及其相關因素探討

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背 景： 本研究目的爲探討懷孕婦女的健康促進生活型態及其相關因素。

方 法： 屬描述性研究，採方便取樣法，以南部某醫學中心產科門診之 172 位懷孕婦女爲研究對象，採結構式問卷收集資料。研究工具包括人口學特性、自覺健康狀況、健康促進生活型態量表、自覺家人(或朋友) 之健康促進生活型態及健康行爲自我效能量表等。

結 果： 研究對象健康促進生活型態總量表標準化得分爲 66.88 (屬中等程度)，其次量表由高到低依序爲人際關係、健康責任、靈性成長、營養、壓力處理及身體活動。不同的教育程度、社經地位、是否有慢性病、運動習慣、睡眠時間和整體健康自評在健康促進生活型態總量表得分上有顯著差異；自覺家人(或朋友) 之健康促進行爲現況及健康行爲自我效能與健康促進生活型態總量表得分有顯著正相關；自覺家人(或朋友) 之健康促進行爲現況、健康行爲自我效能、整體健康自評及慢性病與否等四個變項爲健康促進生活型態的顯著預測因子，總解釋變異量爲 62.4%。

結 論： 本研究結果可作爲產前衛生教育、護理教育及國家婦幼衛生政策推廣上之參考。
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關鍵詞： 懷孕婦女，健康促進，自我效能，健康狀況

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