



Research article

Students' conceptions of health: A cross educational stage survey

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ABSTRACT

The purpose of the study was to reveal participants' health concepts via a cross-sectional survey examining students at different educational stages. Four dimensions of health are integrated within an overall health concept, as drawn from relevant literature: the physical, mental, social, and cultural dimensions. An open questionnaire was administered to 551 students in three educational stages in Taiwan: junior high (13 ± 0.6 yrs), senior high (16 ± 0.6 yrs), and college (19 ± 0.6 yrs). The results indicated that the total participants' major health concerns were situated within the physical dimension, followed by the social and mental dimensions. No participants mentioned a cultural dimension of health. Senior high school students were relatively more concerned with the mental rather than the physical dimension when compared to responses from the other two stages. Moreover, a gender difference was found in that female participants were more concerned with physical aspects while male participants focused more on the social dimension. Different concerns were obvious across the three educational stages; accordingly, an educational approach was suggested to address these findings.

1. Introduction

Maintaining a healthy lifestyle has increasingly become a concern for many Taiwanese, since a lack of adequate physical activity and a diet with high caloric intake have led to the decline of general physical fitness in the populace (Chen, 2015; Chien et al., 2013). As public awareness of lifestyle-related health issues has grown, related campaigns have been launched to promote students' health and quality of life, by increasing efforts to prevent and treat physical defects and conditions commonly seen in students, such as poor vision and dental cavities among others. One example of this kind of effort is the School Health Act issued by Taiwanese Ministry of Education (2015). Unfortunately, however, this and other similar campaigns have primarily focused their attention on the public's physical condition. In contrast, many researchers (Fang, 1995; OECD, 2011; Piko, 1999) have suggested that people's mental, emotional, and social conditions all interact with physical fitness in ways that mutually contribute to overall health. Following this idea, some foundations such as Heads Together (endorsed by The Duke of Cambridge) have launched various mental health programs in schools and societies. These focus on unresolved mental health problems lying at the heart of some of the greatest social challenges. Moreover, the concepts of health are not considered as being universal or static. Health concepts

vary across different contexts. For example, they are bound up within history and cultures (Lin et al., 2018; Spector, 2002; World Health Organization, 1985), vary by gender (Acitelli, 1992; Rokach, 2018), and develop in diverse, individualized ways as individuals go through their own experiences (Esnaola et al., 2018). Keeping in mind the broader concepts of health, as well as the variety and developmental nature these concepts, the current study utilized an open questionnaire to investigate health concepts of students from the junior high, senior high, and college levels in Taiwan. This study applied a cross-sectional survey to address broader, varied and developmental health concepts. The results consequently should provide interesting and innovative information about the effect of age and gender in the conceptualization of health in Taiwan.

1.1. The trend of health promotion

As part of an increased attention in society to improvements in health, many organizations have actively supported and encouraged health promotion. The categories of health promotion have broadened, as an earlier focus on the physical and medical aspects has evolved to a model which asserts that health is more appropriately described within the context of a complex environment containing physical, mental, and socio-ecological influences. This illustrates an expanding perspective

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from biomedical through bio-psychosocial to social–ecological domains. The biomedical aspect emphasizes the physical and biological conditions as they relate to illness and symptoms (Lupton, 2012; Senior and Viveash, 1997; Žaloudíková, 2010). In addition to one's physical and biological conditions, the bio-psychosocial aspect focuses on one's social/psychological health (Mouratidi et al., 2016; Piko and Bak, 2006; World Health Organization, 1948). The socio-ecological sphere encompasses a rather broad scope, concerned not only with physical and psychological aspects, but also societal and environmental health, as for example in coping with one's environment (Reeve and Bell, 2009; World Health Organization, 1985). Interventions aimed at improving the health of individuals are undergoing a paradigm transition to integrate these diverse but interconnected elements.

The transition in the goals of health promotion noted above can be understood as an expansion of focus; emphasis has shifted from longer life to better life. As life expectancies have increased, the prevalence of common mental disorders may be increasing, and difficulties in diagnosing them have gained attention (Reigada et al., 2019). From a biomedical point of view, “longer life” means decreasing the mortality rates caused by diseases and increasing freedom from pain or disabilities. In contrast, pursuit of a “better life” adopts a more holistic perspective (Žaloudíková, 2010) which includes improvements in health status, work and life balance, education and skills, social connection, civic engagement and governance, environmental quality, personal security, and subjective well-being. According to the OECD (2011) well-being indicators cover 11 dimensions identified as essential, in the areas of material living conditions and quality of life. They include housing, income and wealth, jobs and earnings, social connections, education and skills, environmental quality, civic engagement and governance, health status, subjective well-being, personal security, and work and life. These indicators in turn lead to greater satisfaction in life (OECD, 2011). Socio-ecological factors should also play an important role. In other words, a better life is a state of harmony among physical and biological conditions, social interactions, and environments. Health promotion designed to improve individual well-being should not merely focus on the individual's behaviors and habits, but also on psychological health and the intersection of health and various elements within the environment.

1.2. Dimensions of health concepts

An overall health concept is a multi-faceted construct which has been extensively studied, as for example by Reeve and Bell (2009) Žaloudíková (2010), and Piko (1999). As research has begun illustrating various aspects in health, with the previous ideas in mind, four main

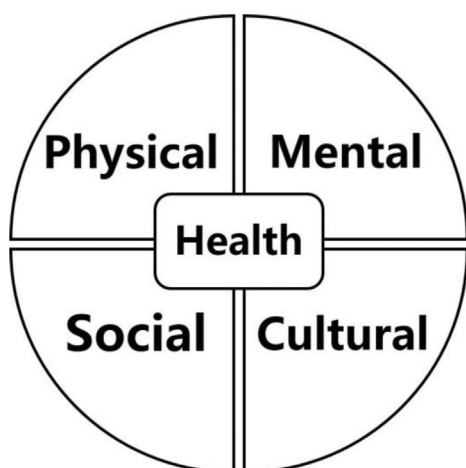


Figure 1. Four dimensions of health concepts.

dimensions have been identified: physical, mental, social, and cultural (Figure 1):

1.2.1. Physical dimension

The physical dimension refers to limitations (Piko, 1999), symptoms (Mouratidi et al., 2016; Piko, 1999), abilities (Piko, 1999), traditional diet (Spector, 2002), activities (Spector, 2002), and absence of diseases (Mouratidi et al., 2016). This dimension, which remains the central concern within people's understanding of what it means to be healthy, is closely connected to elements of one's state of being that are essential for longer life, including exercise/activity, living style, diet, body function, and disease.

1.2.2. Mental dimension

The mental dimension involves an individual's psychological states (Piko, 1999) and is a combination of feeling and functioning well (Huppert, 2009). “Feeling” includes positive emotions, life satisfaction (Headey et al., 1993), positive affection, confidences, and also negative feelings such as anxiety and depression (Headey et al., 1993). “Functioning” involves one's ability to not only cope with life but take control of it, to work productively and fruitfully, and to make a contribution to one's community (World Health Organization, 2007). The mental dimension is therefore closely connected to one's emotional and mental state.

1.2.3. Social dimension

Social health comes from regular, positive social contact with family, friends, neighbors, and peers at school and work (Econation, 2019; Larson, 1996; Piko, 1999). Social support from those in one's family, peers, other social organizations, and social media manifestly exerts an influence on one's health (Angel et al., 1997; Spector, 2002; Dibb, 2019). Obviously, social contact takes place within one's broader social networks, such as family, school, and society environments.

1.2.4. Cultural dimension

The cultural dimension refers to behaviors and concepts particular to a given societal context; as such, they are frequently only meaningful to a certain group of people. This dimension is comprised of traditional beliefs and values (Nayak and Geroge, 2012) and religious practices such as prayer, meditation, ceremony and ritual (Charlier et al., 2017; Nayak and Geroge, 2012; Spector, 2002) which are closely related to the cultural environment within communities. Culture helps to establish a comforting and secure environment that includes such beliefs, values and practices. Therefore, the concepts and behaviors of health are culturally-embedded (Lin et al., 2018).

1.3. Demographic factors addressed in health concepts

Researchers have been focusing on identifying variables that exert a powerful impact on individuals' health concepts (Charlier et al., 2017; Macintyre et al., 2006; Rice, 1991). Among these, age and gender have frequently been considered significant variables.

1.3.1. Age

Age has been recognized as a variable clearly relevant to one's conceptualization of health and related behaviors (Bisegger et al., 2005; Michel et al., 2009; Natapoff, 1978). People of various ages might hold different health concepts and display different behaviors. For example, previous research has suggested that conceptual development including physical and social aspects vary in late childhood, adolescence, and early adulthood (van der Crujisen et al., 2018), and can be influenced by social factors (Bharathi and Sreedevi, 2016; Esnaola et al., 2018) and cerebral development (Sebastian et al., 2008; van der Crujisen et al., 2018). Younger children, adolescents and college students scored differently in a health-related survey (Yang et al., 2001). Moreover, some elderly individuals were reported to be more concerned about feelings mentioned

within the mental dimension, while younger groups were concerned about diet as discussed in the physical dimension (Chang and Chen, 1992; Schmidt and Fröhling, 2000). Age was evidently a critical factor influencing their concept of overall health.

1.3.2. Gender

The overall effect of gender on students' concept of health and related behaviors is controversial (Ackard and Neumark-Sztainer, 2001; Bisegger et al., 2005; Michel et al., 2009). Some studies showed that men and women have their own typical health concepts and behaviors. For example, girls may care more about physical appearance than boys (Bharathi and Sreedevi, 2016), while boys who experience loneliness may be less willing than girls to express their mental states socially (Rokach, 2018). However, other studies revealed no gender effect (Altman and Revenson, 1985; Boruchovitch and Mednick, 2002; Natapoff, 1978). The related issues of whether or how gender differences interact with health concepts are not completely resolved, and thus are worth further investigation.

2. Methods

The research was conducted with an open questionnaire with participants from junior high, senior high, and college in order to investigate the health conceptions from a cross-educational stages survey.

2.1. Participants

Convenience sampling was employed and data were collected from individuals in the northern part of Taiwan. There were 551 students in total contributing to the study, with educational stage and gender groups as shown in Table 1 (below). The samples include 1st year junior high students, categorized as being within early adolescence (13 ± 0.6 yrs), 1st year senior high students in middle adolescence (16 ± 0.6 yrs), and 1st year college students in late adolescence (19 ± 0.6 yrs), due to the unique characteristics for those stages. The gender and educational stages were evenly distributed.

2.2. Instrument

The open questionnaire (Figure 2) was constructed by two groups, each with a different area of expertise. The first group, specializing in science and biological education, included one professor, one doctoral student, and two master students. The second specialized in science and medical education and included three professors and one doctoral student. Two questions were used to query respondents' concepts regarding the state of being healthy or unhealthy. Wording of the questionnaire was confirmed by school teachers to be understandable for all students.

2.3. Procedure

Informed consent forms were sent out to potential participants, and the survey questionnaire was administrated to those who responded affirmatively. After filling in their gender and educational stage, the participants were given six minutes to write down six to ten statements

regarding what it means to be healthy, and then another six minutes to write down six to ten statements about being unhealthy. This period of twelve minutes was set for participants to spontaneously write down their initial statements on the questionnaire, as it was suggested that the concepts which emerge first during free association might reflect their greatest concerns regarding being healthy or unhealthy.

2.4. Data analysis

The participants' responses were analyzed with the four noted dimensions in mind. The responses were grouped within the four dimensions with content analysis. Ten points in total were drawn from those responses in the four dimensions. The meanings of the points and participants' response examples are provided in Table 2.

2.4.1. Reliability

The coding results were checked and discussed by three researchers whose areas of expertise include biology and medical studies. The inter-rater reliabilities for the four dimensions displayed Kappa coefficients ranging from 0.90 to 0.96, and the average was 0.93 ($p < .001$). The results show a high consistency among the three researchers, following Sim and Wright (2005).

2.4.2. Converting the number of statements to percentage values

The total numbers of a given respondent's statements were divided by the numbers of statements in each dimension, representing one's weight for each dimension and point. For example, if a student responded with ten statements, four of which were in the physical dimension, two in the mental dimension, and four more in the social dimension, the physical dimension was weighted at 40% (score 0.4), mental dimension at 20% (score 0.2) and social dimension at 40% (score 0.4). The percentage indicates the weights of a given dimension for every single participant. The scores were analyzed using SPSS22 software; tests carried out include ANOVA, post-hoc comparison, t-test, and effect size as Cohen's d (Cohen, 1992; Thalheimer and Cook, 2002) to describe and compare their health concepts by demographic factors.

2.5. Ethics approval

Ethics approval of FJU-IRB No: C103107 was issued by Fu Jen Catholic University.

3. Results and discussion

3.1. Total participants' responses

The distribution of the total participants' responses regarding their concept of being healthy or unhealthy is presented in Table 3. The majority of participants' responses were located in the physical dimension (67.62%), followed by the social dimension (19.41%) and the mental dimension (10.98%). There were remarkable differences between the physical and social dimensions ($p < .001$) with a large effect size ($d_{PS} = 2.07$), and physical and mental dimensions ($p < .001$) with a large effect size ($d_{PM} = 2.55$). There were also some noticeable difference between the social and mental dimensions ($p < .001$) with a small effect size ($d_{MS} = -0.45$). The results indicated that the physical dimension constituted the greatest concern to the participants, followed by the social and mental dimensions. This finding echoes the traditional thrust of health promotion. Normally, the physical dimension has been considered as the fundamental need for human beings, especially adolescents, as shown in Table 3. Once physical needs are satisfied, people hopefully would start to take account of other needs such as safety, love, and a sense of belonging. This result also indicated that mental and social health were a lesser concern to participants, although the government of Taiwan (Ministry of Education 2015), academia (Fang, 1995; Wang, 2005; Reigada et al., 2019), and various organizations (Heads Together, 2014;

Table 1. Distribution of demographic factors.

Demographic Factors		N	%
Educational stage	Junior high school	168	30.49
	Senior high school	188	34.12
	College	195	35.39
Gender	Male students	276	50.09
	Female students	275	49.91
Total		551	100.00

The Questionnaire of Conceptions of Being Healthy and Unhealthy

Education stage: Junior high school Senior high school College

Gender: Male Female

Question 1:
What is “being healthy”? Please give 6–10 statements in 6 minutes.

Question2:
What is “being unhealthy”? Please give 6–10 statements in 6 minutes.

Figure 2. Health concepts questionnaire.

Table 2. Coding scheme of concepts of health.

Dimension	Point	Response Example
Physical	Exercise/activity	Doing exercises, outdoor activities
	Exercising, being active, going outdoors	Not doing exercise, homebody
	Living style	Routines such as showering, brushing teeth, keeping good hours
	Regular behaviors, habits	Staying up late, obsession with the Internet, irregular bowl habits, etc.
	Diet	Balanced diet, fruits and vegetables, regular diet
	Food ingredients, food seasoning, nutrition, eating behavior	Large amount of oil, salt, & sugar, fussy eater, eat & drink too much, junk food
	Body function	Strong body & clear thinking, cardiovascular function
Mental	Physical appearance, physical capability/performance, energy, health maintain	Body cannot function based on one's will, dark circles, sallow and emaciated
	Disease	Not getting ill
	Medical related: status, environment, disorder behavior, hygiene ideas	Insomnia, constipation, high blood pressure, high blood sugar, high blood lipid, heart disease, diabetes
Mental	Emotion	Good mood
	Feelings such as happy, angry, or sad, etc	Gloomy
	Mental state	Peaceful, optimistic, positive, carefree
Social	Mental performance, mental attributes	Lonely
	School/Peer environment	Interact and share feelings with friends,
	Peer interaction/alienation	Having bad friends
	Family environment Family interaction	Sharing feelings with family
Cultural	Society environment	No interaction with family
	Influence from environment apart from family and school	Work environment, get along well with others, life without pressure, sense of belonging
	Religion practice	Withdrawn from society, drug use, messy environment, work overtime
Cultural	Traditional belief and values	(N/A)
		(N/A)

N/A: lack of relevant response.

WHO, 2007) have been attempting to promote mental and social health concepts. Apparently, the scope of students' concept of health fails to correspond with a holistic concept of health.

Cultural issues are considered an important aspect of an overall health concept by many researchers such as Spector (2002) and Nayak and Geroge (2012) and thus cannot be neglected. However, no participants' responses touched on the cultural dimension, suggesting that no respondents in this study devoted any thought to that dimension of an overall health concept. The lack of responses along the cultural dimension could be a function of respondents' age and education level. It was suggested that health concepts develop along with age, and people hold different priorities within their health concepts in different stages of life (Backett and Davison, 1992). While aging, people gradually establish connections with traditional medicine and religious affiliations, and expand their health concepts accordingly (Baumann, 1961; Chang, 1989). The participants in this study may also have been educated with western medical and physiological science concepts without much occasion to associate health matters with local living beliefs and

experiences. Therefore, they may not yet have developed relatively deep connections with this aspect of their culture.

The four points most frequently mentioned were diet (21.26%), societal environment (18.97%), disease (16.79%), and lifestyle (13.45%). Three of these fall within the physical dimension, which echoes to the previous result that the physical dimension was the major concern. In the social dimension, a dramatic difference was discovered in that the wider societal environment is apparently of greater concern than one's school or family. Complex interactions within the larger society seem to occupy the thoughts of certain subjects. Although participants spend most of their time interacting within school and family contexts, societal issues such as work overtime and work pressure are considered a greater concern than those related to school and family. The sharp contrast between the degree of focus on the societal dimension and the lack of regard for the cultural dimension may reflect the lack of a deeper connection to culture that might be required for them to attribute importance to that aspect.

The original model of a multidimensional concept of health (Figure 1) presents the hypothetically equal distribution of four dimensions. The

Table 3. Participants' conceptions of health.*

Dimension	Educational stage			
	Junior high	Senior high	College	Total
Physical	68.74	60.36	73.64	67.62
Exercise/activity	7.09	4.57	9.07	6.93
Living style	11.17	12.13	16.69	13.45
Diet	23.61	17.98	22.39	21.26
Body function	8.86	8.26	10.38	9.19
Disease	18.01	17.42	15.11	16.79
Mental	9.01	16.33	7.50	10.98
Emotions	3.39	7.81	2.60	4.62
Mental state	5.62	8.52	4.90	6.36
Social	20.37	19.81	18.23	19.41
School environment	.74	.11	.19	.32
Family environment	.27	.05	.05	.12
Society environment	19.36	19.65	17.99	18.97
Others	1.88	3.50	.63	1.99
Cohen's d				
d _{PM}	3.61	1.62	3.51	2.55
d _{PS}	2.17	1.57	2.66	2.07
d _{MS}	-0.69	-1.67	-0.57	-0.45

*Percentage (%).

Cohen's d: Effect Size.

d_{PM}: Effect Size between physical dimension and mental dimension.

results have revealed that in fact the four dimensions were not equally distributed. Further, the study also discovered that the physical dimension seems a basic-needs factor of an overall health concept. Thus only when physical needs are met are people able to consider mental, social, or cultural aspects of their health. The assumption may be used in an attempt to modify the original model into a hierarchical structure.

3.2. Educational stage

Table 3 again indicates that across the three educational stages the physical dimension was the foremost concern, while the social dimension ranked second, followed by the mental dimension. As shown in Table 3, the gap between physical and mental dimensions was significant for total participants. A similar distribution could be observed among the responses of junior high school students ($p < .01$) with a large effect size ($d_{PM} = 3.16$) and of college students ($p < .01$) with a large effect size ($d_{PM} = 3.51$). The gap seemed smaller in senior high ($p < .01$) though still with a large effect size ($d_{PM} = 1.62$). A similar distribution between the physical and social dimensions could also be observed among junior high school responses, with a large effect size ($d_{PS} = 2.17$) and college students, also with a large effect size ($d_{PM} = 2.66$). The gap seemed smaller in senior high, though still with a large effect size ($d_{PS} = 1.57$). Further, a similar distribution between the mental and social dimensions could be observed among junior high school responses, with a medium effect size ($d_{MS} = -0.69$) and college students with a medium effect size ($d_{MS} = -0.57$), but the gap seemed bigger in senior high, with a large effect size ($d_{MS} = -1.17$). Presumably, this result indicates that senior high school participants had shifted at least some level of ongoing attention from the physical sphere to the mental one.

The results also indicated a greater concern for the social over the mental dimension. This may reflect the urgent need for social networking among young people. Social media should be targeted as a greater resource in the promotion of health issues, as recent studies explained that social media, such as films and internet use, have proved to be influential for affecting people's conceptions of health (Reigada et al., 2019; Dibb, 2019). Furthermore, the physical and social dimensions can be observed as explicit behaviors, while phenomena that fall within the

mental dimension are rather implicit and not always easily observed. This might be one reason why the mental dimension received relatively less emphasis.

In addition, Table 3 reveals that, in each dimension, students in different educational stages seemed to express different concerns. Among the groups, college participants gave the highest score to the physical dimension, senior high respondents recorded the highest score for the mental dimension, and the social dimension seems to be the primary concern of junior high participants. The proportions may suggest a chronological progression of health concerns, so that students in certain years in school may feel that the health-related aspects of their lives relatively are more deeply connected to a particular dimension of the overall health concept than for the other two groups. Moreover, the relative ranking of the top four points differed slightly among the three educational stages. The top four points for junior high participants were the same as for the total participants, in the order of diet, society environment, disease, and living style. Senior high participants ordered these slightly differently, placing societal environment first. College participants differed by ranking living style third and disease fourth. Further discussions are to be presented along with results in Table 4.

Table 4 presents the ANOVA analysis of three educational stage participants' statements along the three dimensions. The result of Wilks' Lambda ($\lambda = .95$, $F = 7.29$, $p = .03$) showed a significant interaction among the three dimensions. For the physical dimension, there was a significant difference among three educational stages with the lowest scores for senior high school participants ($F = 9.70$, $p = .00$). Post-hoc results indicate a significant difference between the scores of junior high participants and those of senior high participants, with a small effect size ($d_{12} = 0.26$). Moreover, a significant difference was observed between the scores college participants and the scores of senior high participants with small effect size ($d_{23} = -0.42$).

For the mental dimension, there was a significant difference among three educational stages with the highest scores for senior high school participants ($F = 12.82$, $p = .00$). Post-hoc results again show a significance existing between the scores of senior high participants and the scores of junior high participants, with small effect size ($d_{12} = 0.40$). There was also a significant difference between the scores of senior high

Table 4. ANOVA Analysis of Participants' Conceptions of Health among Educational stages.

Dimensions	Educational stage	N	Mean	SD	F	p	Post-hoc [#]	Cohen's d
Physical	1. Junior high	168	.70	.24	9.70*	.00	1 > 2 3 > 2	d ₁₂ = 0.26
	2. Senior high	188	.63	.30				d ₁₃ = -0.17
	3. College	195	.74	.22				d ₂₃ = -0.42
Mental	1. Junior high	168	.09	.13	12.82**	.00	2 > 1 2 > 3	d ₁₂ = -0.40
	2. Senior high	188	.17	.25				d ₁₃ = 0.07
	3. College	195	.08	.15				d ₂₃ = 0.44
Social	1. Junior high	168	.21	.21	.78	.46		d ₁₂ = 0.00
	2. Senior high	188	.21	.23				d ₁₃ = 0.15
	3. College	195	.18	.20				d ₂₃ = 0.14

* $p < .05$, ** $p < .01$.[#]Scheffe test.

Cohen's d: Effect Size.

d₁₂: Effect Size between junior high and senior high.

participants and the scores of college participants, with small effect size ($d_{23} = -0.44$). There was no significant difference among the educational stages for the social dimension. The effect sizes can be dismissed as the effect sizes are smaller than 0.20 ($d_{12} = 0.00$, $d_{13} = 0.15$, $d_{23} = 0.14$).

The ANOVA result confirmed the previous assumption that senior high participants have diverted their concerns from the physical dimension to the mental dimension. Previous research has suggested this difference between people's health conceptions in different development periods, such as late childhood, adolescence, and early adulthood (van der Crujssen et al., 2018); the current study has further investigated the different stages in adolescence including early adolescence, middle adolescence, and late adolescence, and then discovered the various concerns in each stage.

ANOVA analysis was also applied to compare the health concepts regarding each point across educational stages. For the physical dimension, "exercise/activity" displayed the same result as the overall physical dimension with the lowest scores for senior high school participants ($F = 11.17$, $p = .00$). "Living style" presented the highest scores for college participants ($F = 6.42$, $p = .00$). Finally, "body function" and "disease" displayed similar results, as no significance was found. Within the mental dimension, "emotion" presented the same result as the overall mental dimension with the highest scores for senior high school participants ($F = 8.51$, $p = .00$). For the social dimension, "school/peer environment" displayed the highest score for junior high participants ($F = 4.95$, $p = .01$); while in "family environment" and "society environment", there were no significance among educational stages.

Along with Table 3 and Table 4, the result showed that the physical dimension was the major concern for respondents in each of the three educational stages, consonant with the traditional focus of health promotion. Among the three groups, senior high participants scored relatively lowest for the physical dimension. In "exercise/activity", senior high participants also scored significantly lower than junior high and college participants. These results echoed previous studies in suggesting that senior high students care less about exercise/activity. This was in line with findings of the Ministry of Health and Welfare (2017), which indicated that over 85% of senior high students spent little time in exercise. Academic stress could be one reason that senior high students have little time to exercise, as they remain occupied with study and classes. College participants scored significantly higher for "living style" than did junior and senior high participants. In Taiwan, college students lead rather independent lives and enjoy a more flexible timetable as they start to manage their lives, compared to the fixed routine and habits prevalent in high schools, as mentioned by some participants. Respondents from all three educational stages show a similar lack of concern with the significance of "body function", as youth tends to be associated with relatively strong and healthy bodies.

Responses of senior high participants mentioned the mental dimension significantly more often than did junior high and college participants (Table 4). Senior high participants also scored "emotion" significantly higher than did junior high and college participants. Many adolescence studies (e.g. Nishizawa et al., 1997; Siegel et al., 1998) have suggested that teenagers at this stage may be subject to relationship issues, mood swings influenced by hormonal changes, academic stress, or confusion about their future, lending increased importance to their emotional state.

Though the overall responses of the three educational stage participants did not significantly differ with respect to the social dimension, they differed with respect to "school/peer environment". Junior high participants rated the latter significantly higher than did senior high and college participants. It has been suggested that adolescents shift the focus of their relationships from family members to peers, which may explain the finding that junior high school students care more deeply about their school friends (Brown and Larson, 2009). As young people grow into high school and college settings, the influence of peers often gradually fades and they start to establish greater self-identity and awareness.

In summary, results indicate that each educational stage has its particular concern. Though the physical aspect was the major concern for all, among three educational stages, junior high respondents specifically emphasized their school environment, senior high students were concerned with emotional aspects but cared less about exercise/activity, and college students shifted focus to their living style.

3.3. Gender

Table 5 presents the distribution of female and male participants' statements regarding the three dimensions. First, both male and female participants expressed their concerns with the same pattern of emphasis as the total group, with physical dimension in the first place, followed by the social and mental dimensions. The presentation of effect size between male and female respondents also echoes the percentage of total participants' responses, in that a large effect size/difference exists between the physical and mental dimensions (Male: $d_{PM} = 2.36$, Female: $d_{PM} = 2.70$), as well as between the physical and social dimensions (Male: $d_{PS} = 1.67$, Female: $d_{PS} = 2.57$). The effect size between the mental and social dimensions is considered smaller (Male: $d_{MS} = -0.65$, Female: $d_{MS} = -0.22$). Further, the effect size of female participants in the physical and mental dimensions ($d_{PM} = 2.70$) is higher than the effect size of male participants ($d_{PM} = 2.36$), indicating that female participants display a larger difference than male participants with respect to the physical and mental dimensions. The effect size among female participants between the physical and social dimensions ($d_{PS} = 2.57$) is higher than that for male participants ($d_{PS} = 1.67$), indicating that female participants display a larger difference in relation to the physical and social dimensions than do

Table 5. ANOVA analysis of participants' conceptions between genders.

Dimensions	Gender	N	Mean	SD	F	p	Cohen's d
Physical	Male	276	.66	.27	6.96*	.01	-0.23
	Female	275	.72	.25			
Mental	Male	276	.10	.20	.80	.37	-0.10
	Female	275	.12	.19			
Social	Male	276	.24	.23	16.65**	.00	0.39
	Female	275	.16	.18			

Cohen's d: Effect Size
 Male: $d_{PM} = 2.36$, $d_{PS} = 1.67$, $d_{MS} = -0.65$
 Female: $d_{PM} = 2.70$, $d_{PS} = 2.57$, $d_{MS} = -0.22$

* $p < .05$, ** $p < .01$.

males. Meanwhile, the absolute value of effect size of male participants for the mental and social dimension ($d_{MS} = -0.65$) is higher than that for females ($d_{MS} = -0.22$) showing that both male and female participants' score for the social dimension is higher than for the mental, while male participants displayed a larger difference than females.

Second, the result of Wilks' Lambda ($\lambda = .97$, $F = 8.34$, $p = .00$) showed a significant difference between female and male participants, with female participants' scores for the physical dimension higher than male participants' ($F = 6.96$, $p = .01$). A significant difference exists between the scores of male participants and the scores of female participants in physical dimension with small effect size ($d = -0.23$). Male participants' scores were higher than female participants' for the social dimension ($F = 16.65$, $p = .00$). A significant difference exists between the scores displayed by male participants and those of female participants in the social dimension, with small effect size ($d = 0.39$).

A t-test was applied to compare the health concepts for each point by male and female participants. The results also highlighted a significant difference in that girls emphasized "exercise/activity" ($t = 1.96$, $p = .05$) and "emotion" ($t = 2.24$, $p = .03$) much more than boys, while boys' concerns focused on "society environment" ($t = 4.06$, $p = .00$) much more than girls.

Between genders, female participants scored the physical dimension significantly higher than did male participants. Young girls expressed a focus on "exercise/activity". However, men and women might have different motivations for pursuing physical fitness. Smith, Handley, and Eldredge (1998) emphasized that women tend to exercise for extrinsic appearance-related reasons while men exercise mainly for the intrinsic pleasure and challenge (Kilpatrick et al., 2005; Smith et al., 1998). Though the responses of male and female participants did not differ for the mental dimension, they did differ with respect to "emotion". The responses of female participants touched on this aspect much more than did those of male participants. This finding was generally in line with the traditional stereotype that women are more concerned about emotional aspects of life, and also are more willing to talk about their feelings (Fischer et al., 2004; Snell et al., 1988).

Male participants expressed significantly more concerns regarding the social dimension than did female participants, especially with respect to "society environment". Previous research (Acitelli, 1992; Merchant, 2012) has suggested that women are more comfortable managing challenges in social relations, due to their greater willingness to talk and greater degree of social interaction with others. Peng et al. (2004) found that male students encountered social anxiety rather more often than did female students, while another study (Chang et al., 2010) reported that younger female students had higher social anxiety than male students. Men and women might respond differently when dealing with the challenges of social relations.

4. Conclusion and implications

4.1. Health concepts and concerns largely situated in the physical dimension

While responses in the mental and social dimensions were noted in each group, the physical dimension remains their major concern, in line with previous research. Although four dimensions are identified, the proportions of four dimensions are not balanced; as a result, a gap between ideal and actual health concepts was discovered by the current study as well as previous research. A more comprehensive and integrated understanding of health and life could be promoted by presenting students with appropriate coverage of four dimensions, which in turn suggests the importance of health education. In other words, the integration of all four aspects is an essential feature in the move to shift the public's emphasis from longer life to better life. Experiences of daily life have helped individuals construct greater self-awareness that encompasses physical, mental and social aspects. However, health programs such as Taiwan's Ministry of Education (2015) have frequently merely targeted the physical dimension. We have suggested that mental and social aspects should be included in health education.

4.2. Different concerns reported among the three educational stages

Although various dimensions are recognized by all participants, different levels of concern were reported at different stages of adolescence. It was found that students along their different stages in their educational path seem to face specific concerns and thus emphasize different dimensions of an overall health concept. Following the suggestions of Chang and Chen (1992), Yang et al. (2001) and Brumby et al. (1985), we suggest that health education and programs should meet the particular needs of each stage by highlighting appropriate health concepts. An appropriate awareness of relevant aspects, a positive attitude and good practice are all important factors to guide students to consider their health in their daily lives (Mohd-Nor and bit-Lian, 2019). For example, a curriculum emphasizing social skills through role-playing should be offered to junior high school students since their key social focus and influence has become their peers. Counselling sessions for emotional management and awareness should be promoted for senior high students who are facing remarkable mental stress and challenging conditions. Finally, courses about nutrition and methods of leading a healthy lifestyle should be provided for college students to address factors that have changed with their greater independence while living away from home, as Gamble and Crouse (2020) have highlighted. Our findings present a different solution compared to previous research such as Brumby et al. (1985), which indicated that university students were more aware of the mental and social dimensions than senior high stu-

dents. The difference may stem from the differing geographic location and generational setting of the two surveys. Finally, collaboration between institutions (across education stages) may provide guidance and development strategies to support students in transition into further stages (Gamble and Crouse, 2020).

Also notable are the significantly low scores of senior high students for the physical dimension, when compared to junior high and college groups. As discussed in the government research mentioned previously (Ministry of Health and Welfare, 2017), more than 85% of senior high students do not engage in exercise. It is essential to remind them of the importance of physical health while encouraging them to engage in physical activities and follow a healthy diet and lifestyle. Therefore, educational authorities should notice the gap between concept and action; relevant health education needs to be implemented in Taiwan.

4.3. The cultural dimension was never mentioned by the students

The current study did not discover any response in the cultural dimension from participants though the four dimensions are noted in previous studies. This gap in the data illustrated that participants in three educational stages might have never considered culture as a factor influencing health. As Spector (2002) has suggested, educational curriculum should include key features of local culture, such as religious and spiritual activities, to help students establish the connection between health and culture. Though the participants did not consider culture as a concept related to health, Taiwan is a multi-cultural country due its history of immigration and cultural infusions from abroad. With this in mind, further research may focus on cross-cultural comparisons of the cultural dimension of health concepts, examining for instance the indigenous and Han people of Taiwan, or the wider global context of the East and West. In addition, an investigation across different age groups across life span might induce the various health conceptions in cultural dimension.

4.4. Limitations

The study has four limitations. First, it adopts an approach of convenience sampling, in that data were collected from participants from the northern part of Taiwan. Second, the study focuses solely on participants' education stage and gender. Other personal factors that are worth further exploration were not included, such as socioeconomic background, physical condition, and BMI status. Third, the research instrument is an open questionnaire which allows participants to respond using free association. Other instruments could be utilized for future investigation to strengthen the study and include more diverse aspects. Fourth, people's concepts regarding health in different cultures could be investigated for further studies. With the limitations of the current study, various sampling methods, instruments, and cultural comparisons could be applied in future studies.

Declarations

Author contribution statement

M. C. Hsin, C. Y. Lin, H. Y. Li, S. Y. Lin: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Declaration of interest statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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