Quality of life among adolescents in Hong Kong: General and gender-specific effects of self-efficacy and mindfulness

Introduction

Studies of quality of life among adolescents in the Positive Youth Development literature

Earlier youth development models focus on the influence of demographic, relationship, and individual variables but mostly based on a deficit view that sees adolescents as problems to be managed or having deficits to be corrected (Shek et al., 2019). Adolescents in Hong Kong have been under the influence of risk factors summarized by unhealthy values including pragmatism with overemphasis on success, materialism that believing money makes one happy, and egocentrism that focusing on own benefits over those of others (Shek and Siu, 2019). However, a current perspective on youth development also concerns protective factors that shelter adolescents from heightened risks. Studies under such new perspective covers the healthy and holistic development that has formed in a new area of knowledge named as Positive Youth Development (PYD) in last three decades (Lerner et al., 2005; Qi et al., 2020). Several major models of PYD has been identified, namely the strengths of young people, the developmental plasticity, internal developmental assets, ad external developmental assets (Shek et al., 2019).

Quality of life (QoL) is a commonly used positive indicators that applied to all stages of human life. According to the World Health Organization, quality of life (QoL) is defined as people's "perceptions of their position in life in the context of the culture and value systems in which they live, and in relation

to their goals, expectation, standards, and concerns" (WHOQoL Group 1994). It has been widely acknowledged that measures of QoL should include various factors, such as physical, psychological, and social well-being, that reflect the cultural and social context and define a good life. Most QoL measures emphasize the importance of understanding people's subjective interpretations and evaluations of their experiences. Although the QoL of children and adolescents can be examined based solely on their self-perceptions, proxy reports from parents and teachers can also be used (Solans et al. 2007). Adolescent's subjective interpretations and self-reported evaluations of their QoL provide the primary sources of data for examining how adolescents define the important qualities of life (Huebner and Gilman 2014).

Consistent with the literature on adults, adolescent QoL has been promoted as an overarching indicator of young people's subjective, cognitive appraisal of their overall life experiences and/or of specific domains, such as health, family, school, and social life (Huebner and Gilman 2014). It should be noted that QoL differs from happiness, which emphasizes pleasant affects at the present moment (Philips 2006). The commonly used QoL instruments measure different numbers of domains, ranging from three to 17 (Solans et al. 2007). The QoL of adolescents has been found to deteriorate when they encounter issues in their physical and social transitioning and in coping with their environment, due to physiological processes such as hormonal changes and the social processes of adjusting to school and peer relationships. Cross-cultural research suggests that adolescent QoL decreases from 11 to 12 years of age until 15 to 16 years of age (Michel et al. 2009). This line of research also suggests that

adolescents' QoL reflects their gender-specific challenges and the cultural context. Because culture plays an important role in determining QoL and most of the studies on QoL have been based on Western contexts, there has been a call for more studies based on different cultural groups, including Chinese populations (Shek, 2014). A few cross-cultural studies have attempted to identify the role that cultural values play in determining adolescent QoL.

Roles of self-efficacy and mindfulness on adolescence development

There are similarities and differences among definitions and conceptualizations of PYD, Lerner et al. (2005) identified 5Cs (competence, confidence, connection, character, and caring). Catalano et al. (2004) proposed 15 aspects of development goals and outcomes that includes self-efficacy and spiritual intelligence. The relationship of self-efficacy, mindfulness and QoL have been selected in this study. In Lerner's definition, self-efficacy belongs to the category of confidence that involves an internal sense of overall self-worth, while mindfulness may be classified under the category of competence that contributes to the cognitive abilities (Lerner et al., 2005). In the work of Catalano et al. (2004), self-efficacy forms a distinctive dimension in PYD, while spirituality of a young people may originate from religiosity or nontraditional forms of spiritual practice and mindfulness can be classified in such dimension.

Self-efficacy refers to the "beliefs in one's capabilities to organize and executive the courses of action required to produce given attainments" (Bandura 1997: 3). Self-efficacy plays an important role

in determining behavior and can influence how individuals approach the challenges and obstacles they face in life (Maddux 2002). Based on social cognitive theory, the concept of self-efficacy emphasizes how people are able to exercise some control over their self-development and life circumstances (Bandura 2005). General self-efficacy has been defined as an individual's perceived efficacy in performing in a range of situations (Judge, Erez, and Bono 1998).

Although it is widely agreed that the determinants of QoL are largely contextual, self-efficacy has been identified as one of the most important personality factors contributing to the variance in QoL (Proctor, Linley and Maltby 2009). Self-efficacy is also considered to be a universal concept and a critical factor influencing adolescent development because it is influenced by individuals' schooling, peers, and family experiences (Schunk and Leece, 2005). In addition to being a significant determinant of adolescent development, self-efficacy has been shown to be related to the promotion and treatment of health and mental health, academic and career development, and sports participation (Bandura, 2005; Maddux 2002).

The concept of mindfulness, which is defined as paying nonjudgmental attention to the present (Kabat-Zinn 2013), has also attracted the interest of researchers and practitioners in the past few decades. Thousands of studies have investigated the potential benefits of mindfulness in improving attention and promoting well-being (Eberth and Sedlmeier 2012). Although the concept of mindfulness originates from the meditative traditions of Asia, it has been integrated with various psychological approaches to promote health and mental health, with an emphasis on the connection between the body

and mind (Siegel, Germer and Olendzki 2009).

The early studies of mindfulness focused on its effects on adults. However, some recent studies have extended its application to children and adolescents, in response to calls to develop new ideas and strategies for nurturing the health and well-being of young people (Greenberg and Harris 2011). Some studies have emphasized the therapeutic values of mindfulness in relieving the symptoms of physical and mental illness (Lo et al. 2020; Petter, Chambers, McGrath and Dick 2013; Vickery and Dirjee 2016). Other studies have reported that mindfulness should be cultivated as a protective factor in child development, in view of its associations with various positive factors such as happiness, healthy self-regulation, QoL, and positive mental health (de Bruin, Zijstra and Bogles, 2014; Kuby, McLean and Allen 2015). Although a study reported insignificant differences in terms of age and gender among adolescents (Greco, Baer and Smith 2011) further research is needed to examine whether mindfulness serves as a protective factor in maintaining the well-being and QoL of children and adolescents.

Studies of QoL, self-efficacy, and mindfulness in Chinese societies and the effects of demographic variables on the relationships between these factors

An increasing number of studies have examined the cultural differences in QoL, self-efficacy, and mindfulness. Factors such as demographic background, family and peer relationships, and school and neighborhood environments have been shown to contribute to the contextual differences and cultural variations in adolescent QoL (Bradshaw, Keung, Rees and Roswami 2011). Although some argue that

demographic factors such as age and sex account for little of the variance in QoL, significant decrease in QoL was found adolescent increases from the ages of 11 to 16 and such effect was stronger among female, with the exception that satisfaction with friends and sexuality maintained (Goldbeck, Schmitz, Besier, Herschbach and Henrich 2007). A number of Western studies have reported that female adolescents have a poorer perception of self and other determinants of QoL, and these patterns have been replicated in some cross-national studies. For examples, a cross-cultural study recruited 21590 children and adolescents from 12 European countries found that boys and girls had similar level of QoL at age of 8 but girls tended to deteriorate from the age of 11 (Michel et al., 2009). Such changes were domain-specific and the disadvantages of female were more significant in physical well-being, and self-perception from the age of 11 and in emotional health from age of 13. Girls maintained a small advantage in peer and social support all through the years but such strengths in school environment in earlier years after age of 16 (Michel et al., 2009). Finally, a study conducted in Australia also identified several domain-specific gender differences in QoL (Meade and Dowswell 2015). Specifically, female adolescents reported having a much lower perception of their physical well-being and a somewhat lower perception of their psychological well-being and family life, whereas their peer relationships were marginally better than those of male adolescents, and their school-related QoL was similar to male adolescents. In this study, the age effect was consistent across five domains and adolescents reported significant decrease in all dimensions from the ages of 12 to 17 (Meade and Dowswell 2015).

However, studies on the gender differences in Chinese populations have produced largely

inconclusive results. A study in Taiwan found that female adolescents reported a lower QoL, especially in the psychological well-being and pain domains, than their male counterparts (Fuh, Wang, Lu and Juang 2005). Age effect was not significant as the study recruited students from grade 7 to 9 only, although a trend of deterioration in QoL was found. In contrast, a study on Hong Kong adolescents reported that girls had greater life satisfaction than boys because the boys experienced a more salient drop in life satisfaction over time than the girls and that family functioning significantly predicted adolescent life satisfaction over time (Shek and Liu 2013). Interestingly, another study in Hong Kong reported no gender differences in life satisfaction among adolescents, and only personal variables, such as self-esteem and purpose in life, were found to predict adolescent life satisfaction (Chui and Wong 2016). Besides, the adverse effect of age on life satisfaction was found in female only, not in male in regression analysis.

However, few studies have examined the roles of self-efficacy and mindfulness in Chinese populations. The cross-cultural generalizability of the concept of self-efficacy is still a matter of debate, and few studies have examined the cultural differences in mindfulness. A study of the role of self-efficacy in determining positive mental health in Germany, Russia, and China suggested that it had a buffering effect against daily stress, which served as a protective factor, across cultures (Schönfeld, Brailovskaia, Bieda, Zhang and Margraf, 2016). In a study conducted in Hong Kong, self-efficacy was found to have a direct effect on life satisfaction as a positive development indicator (Sun and Shek 2013). However, a study in mainland China reported that girls had lower self-efficacy than boys and

that this explained girls' lower subjective sense of well-being (Ma and Zeng, 2015). Another interesting debate has focused on the role of self-efficacy in affecting the performance of people from individualist and collectivist cultures. In a cross-cultural review, self-efficacy was found to have less predictive value in determining performance and low self-efficacy in collectivist groups, in which a realistic rather than optimistic mindset prevails (Klassen 2004). However, the implications of the findings for QoL and adolescent development are not clear.

Few studies have examined mindfulness in Chinese adolescent populations. One study found that adolescent mindfulness was positively correlated with life satisfaction and that this relationship was mediated by self-evaluation (Tan, Yang, Ma and Yu 2016). Another study on Chinese adolescents reported that mindfulness was correlated with sleep quality and that this relationship was moderated by self-control (Liu et al. 2018). Other studies of mindfulness-based interventions for children have not included measures of mindfulness (for examples, Lo et al. 2020; Zhang et al. 2017).

This study is an extension of a few earlier attempts in studying the roles of two distinctive constructs in PYD, self-efficacy and mindfulness in well-being. For examples, in a study on university students, self-efficacy and mindfulness both predicted well-being, depression, anxiety and stress (Soysa and Wilcomb 2015). Another study of students also found that higher levels of mindfulness were associated with greater self-efficacy and low anxiety (Fallah, 2017). While self-efficacy involves a judgment about one's ability to complete a task, mindfulness skills such as describing, acting with awareness, and accepting without being judgmental can promote self-efficacy and emotion regulation (Luberto et

al., 2014). Studies consistently found that both self-efficacy and mindfulness can contribute to well-being but all these findings were based on university samples.

To highlight the research gap, very few studies investigated the effects of mindfulness on well-being on Chinese adolescents, especially on quality of life, and none of the studies were based on adolescents at younger age, i.e. age below 14. This study would serve as one of the earliest attempt in investigating in differential effects of self-efficacy and mindfulness in adolescent QoL in Chinese adolescents. It helps to explore how two important protective factors in adolescent development can contribute and identify if age and gender can interact with two factors in different domains of well-being.

In this study, we explore the effects of mindfulness and self-efficacy on the QoL of Chinese adolescents in Hong Kong. We use multiple regression analyses to examine the following three hypotheses:

Hypothesis 1 states that demographic variables (age and sex) predict QoL (total score and four subscales). Hypothesis 2 states that after controlling for demographic differences, relationships (family functioning) predict QoL (total score and four subscales). Finally, hypothesis 3 states that after controlling for demographic differences and relationships, self-efficacy and mindfulness predict QoL (total score and four subscales).

Methods

Procedure and participants

Students from three mainstream secondary schools in Hong Kong were invited to participate in a study of student QoL. After gaining permission from the school principals, invitation letters were distributed to the students and their parents. Those who were granted parental consent were informed about the study and were invited to participate in the study on a voluntary basis. All of the questionnaires were collected anonymously and did not include any personal data. The study was based on a cross-sectional design. Data collection was carried out from October 2017 to February 2018. Inclusion criteria of the study was that participants should be enrolled in secondary one to five in the participating schools in Hong Kong and students participated in the study on voluntary basis with their parental written consent. There was no exclusion criteria in this study. Such selection can allow the researcher to investigate the age and gender effects in adolescence, especially for the adolescent at younger age, and the interaction effects on self-efficacy and mindfulness. The study was approved by the research office of the first author's university (ref. HSEARS20180103003).

Measures

Quality of Life

The Pediatric Quality of Life (PedsQL) inventory is a 23-item self-reported instrument (Varni et al. 1999) that measures QoL in four domains: physical, emotional, social, and school functioning. The items are scored on 5-point scales (0= *Never* and 4 = *Almost Always*), with higher scores representing higher QoL. The Chinese version of PedsQL has been shown to have satisfactory validity and

reliability (Lin et al. 2012). In this study, Cronbach's alphas were .90 for total, .89 for physical, .75 for emotional, .89 for social, and .74 for school functioning.

Mindfulness

The Child and Adolescent Mindfulness Measure (CAMM; Greco, Baer and Smith 2011) is a 10-item self-reported instrument. The items are scored on 5-point scales (0 = *Never True* and 4 = *Always True*), with higher scores representing a greater tendency to be mindful in everyday life. The CAMM has been used in Chinese studies and has been shown to have good validity and reliability (e.g., Liu et al. 2018; Zhou et al. 2017). In this study, Cronbach's alpha was .82.

Self-efficacy

The General Self-Efficacy (GSE) scale is a 10-item self-reported instrument (Schwarzer 1993). The items are scored on 4-point scales (1= *Not At All True* and 4 = *Exactly True*) with statements such as "I can always manage to solve difficult problems if I try hard enough" and "I am confident that I can deal efficiently with unexpected events." Higher scores indicate that the participants have a more optimistic self-belief in their ability to cope with difficult demands in life. The Chinese version of the GSE has been shown to have good validity and reliability (Zhang and Schwarzer 1995). In this study, Cronbach's alpha was .90.

Family Functioning

The family Adaptation, Partnership, Growth, Affection, Resolve (APGAR) questionnaire is a 5-item self-reported instrument (Smilkstein, Ashworth and Montano 1982). The items are scored on 5-point scales (0 = *Hardly Ever* and 4 = *Almost Always*) with statements such as "I am satisfied that I can turn to my family for help when something is troubling me" and "I am satisfied with the way my family and I share time together." Higher scores indicate that the participants' have a better perception of their family function. The Chinese version of the APGAR has been shown to have good validity and reliability (Chan et al. 1988). In this study, Cronbach's alpha was .86.

Statistical analysis

The descriptive statistics (mean, standard deviation, and Pearson correlations) were calculated for self-efficacy, mindfulness, and QoL (including the total scale and subscales). Cronbach's alphas were computed to assess the scale reliability. Hierarchical regression analyses were conducted, in which the QoL total score and four subscales were the dependent variables, and three layers of independent variables—demographic (age and gender), family (family functioning), and individual (general self-efficacy and mindfulness) variables—were entered in three steps to determine the significance of each layer. The demographic, relationship, and individual variables were entered together in one step as independent variables, and three models were analyzed: in one model, the whole sample was used to test the effects of gender after controlling all of the other variables, whereas in the other models, the male

and female participants were examined separately. All of the analyses were conducted with the SPSS 23 statistical package.

Results

Characteristics of the sample and the effects of age and sex

Table 1 shows the profile of the sample. The sample comprised 462 eligible adolescents; 61% were female, and the participants ranged from 11 to 18 years in age (mean, 14.11 years; SD, 1.44 years). The number of family members living together was 3.97.

Table 2a shows the correlations between the main variables. Family functioning, self-efficacy and mindfulness were mildly correlated to the QoL total and subscales. As shown in Table 2b, self-efficacy was more strongly correlated with the QoL physical subscale for the boys than the girls, whereas the correlations between self-efficacy and the QoL emotional subscale and the QoL school subscale were stronger for the girls. For the QoL physical subscale, a correlation with mindfulness was found for the girls but not the boys. For the QoL social subscale, a correlation was found with family functioning for the girls but not the boys. These results support further investigation of the gender differences.

Table 3a summarizes the descriptive statistics of the main variables by gender and age. The independent *t*-test results indicate that the boys reported higher self-efficacy than the girls ($t = 3.41$, $p < .01$). The male adolescents scored higher in QoL (total score, physical, emotional, and school) and mindfulness than the female adolescents, whereas the female adolescents scored higher in social QoL

than the male adolescents, although the differences were not significant.

The participants were categorized into five age groups (12 or below, 13, 14, 15, and 16 or above) and the age effects were examined using one-way analysis of variance. The changes in QoL across the age groups were domain-specific, with the QoL total scores and other three subscales (emotional, social, and school) dropping continuously with the increasing age of the participants. However, only the QoL emotional and school subscales reached the level of statistical significance. For the QoL emotional domain, the 14-year-old participants had a significantly lower score than the 12- and 13-year-olds (both $p < .05$). For the QoL school domain, the 12-year-olds had a significantly higher score than the 14- and 15-year-olds ($p < .05$) and those 16 or above ($p < .01$). The 13-year-olds had a significantly higher score than the 15-year-olds ($p < .05$) or those 16 or above ($p < .01$). The age effects on APGAR, self-efficacy, and mindfulness followed the trend of the QoL total score, but only the effect on mindfulness was significant. The 12-year-olds had a significantly higher level of mindfulness than the 14- and 15-year-olds ($p < .01$) or those 16 or above ($p < .05$).

The age effect was further analyzed in male and female participants separately using one-way analysis of variance. The changes in QoL total score and four domains, self-efficacy, and mindfulness across five age subgroups in male participants were insignificant (all $p > .05$). For female participants, the 12-year-olds or younger subgroup had a significantly higher scores than the 16-year-olds or older subgroup in quality of life total score ($p < .05$). For the emotional domain, the 12-year-olds or younger subgroup had a significantly higher scores than the 14-year-old subgroup ($p < .01$) and the 16-year-olds

or older subgroup ($p < .05$). For the school domain, the 12-year-olds or younger subgroup had a significantly higher scores than the 15-year-old subgroup, and the 16-year-olds or older subgroup (both $p < .05$). Such changes in all quality of life subdomains, self-efficacy, and mindfulness deteriorated but does not meet the level of significance in the analysis.

Hierarchical regression models

Table 4 shows the hierarchical regression results for the QoL total and subscales. The demographic variables (age and sex) were first entered into the regression, followed by the family variable (APGAR), and finally the individual variables (self-efficacy and mindfulness). The results for the QoL total score and four subscales were similar. As shown in Table 4, two demographic variables (i.e., gender and sex) were significant predictors of the QoL total score and the emotional and school subscales, although they only accounted for 1% to 3% of the variance.

In the second step, family functioning was found to be a significant predictor of all of the QoL total and subscales, except for the physical subscale. Family functioning explained 5% of the variance in overall QoL, 3% in the social subscale, 6% in the emotional subscale, and 8% in the school subscale.

In the third step, two individual variables (i.e., self-efficacy and mindfulness) were found to be the strongest predictors of QoL in the total and four subscales. The individual variables were significant predictors of QoL. Interestingly, although self-efficacy and mindfulness were associated with the physical subscale to similar degrees, the associations between mindfulness and the QoL total score and

the emotional, social, and school subscales were higher than those for self-efficacy. Together, the individual variables accounted for 20% of the total variance in QoL and 6% to 17% of the variance in the individual subscales. Although gender explained a small proportion of the variance in QoL, we further investigated the patterns of the effects of APGAR, self-efficacy, and mindfulness on QoL separately for the boys and girls.

Tests of the effects of gender on QoL

We further investigated the effects of APGAR on the regression models as shown in Tables 5a, 5b, and 5c. The effects of self-efficacy and mindfulness on the regression models were further tested as shown in Table 6a, 6b, 6c, and 7a, 7b, and 7c. The QoL total and four subscales were the dependent variables. The demographic variables, family variable (family functioning), and individual variables (self-efficacy and mindfulness) were selected as independent variables. The male and female participants were grouped together in the first model (mainly to test the effects of the gender) and separated in the second and third models (to examine the differences).

As shown in Table 5a, APGAR was a significant predictor of the total QoL, and the emotional, social, and school subscales and accounted for 4% of the variance in the social subscale, 8% in the total score and emotional subscale, and 10% in the school subscale. These findings suggest that better perceived family functioning predicted a higher overall QoL and a better-quality social life and school life. As shown in Tables 5b and 5c, APGAR was a significant predictor of QoL in the emotional and

school subscales for boys, and in the total score, and emotional, social, and school subscales for girls. For boys, APGAR accounted for 12% of the variance in the emotional subscale and 10% of the variance in the school subscale. For girls, APGAR accounted for 8% of the variance in the total QOL, 6% of the variance in the emotional subscale, 8% in the social subscale, and 10% of that in the school subscale. These findings suggest that better perceived family functioning predicted a higher quality of emotional life and school life for boys, and higher overall QoL and quality of emotional life, social life, and school life for girls.

For the individual variables, as shown in Tables 6a and 7a, self-efficacy and mindfulness were both significant predictors of overall QoL and all of the domains of QoL. After controlling for the variance in the demographic and family variables, self-efficacy accounted for 14% of the variance in overall QoL. In the individual domains, self-efficacy explained 7% of the variance in the physical subscale, 8% of that in the emotional and school subscales, and 11% in the social subscale. Mindfulness also accounted for 14% of the variance in overall QoL, 3% of the variance in the physical subscale, 10% in the social subscale, 13% in the school subscale, and 15% in the emotional subscale, after controlling for the variance in the demographic and family variables.

The gender effects were further investigated by comparing the total variance with the results of the separate regression models for the two genders. As shown in Table 6b, self-efficacy explained 16% of the variance in overall QoL for boys, 7% of that in the emotional subscale, 8% of that in the social subscale, 9% of that in the school subscale, and 16% of that in the physical subscale for boys. As

shown in Table 6c, self-efficacy explained 12% of the variance in overall QoL for girls, 2% of that in the physical subscale, 8% of that in the social subscale, 11% of that in the emotional subscale, and 13% of that in the school subscale. Table 7b shows that mindfulness explained 12% of the variance in overall QoL for girls, 1% of that in the physical subscale, 10% of that in the social subscale, 15% of that in the emotional subscale, and 18% of that in the school subscale for boys. Table 7c shows that mindfulness explained 17% of the variance in overall QoL for girls, 5% in the physical subscale, 11% in the social subscale, 12% in the school subscale, and 17% of the variance in the emotional subscale.

It is interesting to note that self-efficacy and mindfulness explained the variance in overall QoL to similar degrees when the sample was analyzed as a whole. However, when the genders were separated, the predictive power of self-efficacy was stronger for boys and that of mindfulness was stronger for girls. When the effects of the individual domains were considered, the predictive power of self-efficacy on the physical domain was strongest among the boys. The predictive power of mindfulness was strong for both genders on the emotional subscale and was stronger than that of self-efficacy on the school subscale for boys.

In sum, age and gender were found to have mild domain-specific effects on QoL. Perceived family functioning also had a mild and relatively small effect compared with the individual variables. The effects of self-efficacy and mindfulness were strong predictors of adolescent QoL, and they had somewhat different associations with the QoL total and individual subscales when they were considered separately in the two gender groups.

Discussion

This study examined the effects of demographic, relationship, and individual variables, on adolescent QoL. This combination of family and individual variables, especially mindfulness, has not been used in previous studies of adolescent QoL in Chinese and Western contexts. We also explored the possible gender specific effects of family functioning, self-efficacy, and mindfulness on adolescent QoL.

Consistent with the findings of most Western and Chinese studies, sex and age were found to have mild effects on adolescent QoL (Michel et al. 2009: Shek and Liu 2013). The boys enjoyed a slightly better QoL, except in social life, a domain in which female usually show an advantage. A gender difference in age effect on QoL observed in this study was interesting. While the QoL for boys was relatively stable, the deterioration of QoL for girls in total scores, emotional and school domains deserved attention. Thus, the findings of this study support hypothesis 1 partially. Such finding confirmed that adolescent period experienced more challenge in the development and female is slightly more vulnerable against male during this critical period of time.

The inclusion of the family and individual variables in the regression analyses provided some interesting insights into the nature of adolescent QoL. Hong Kong is a strongly collectivist culture, and as expected, the adolescents' perception of their family life significantly predicted their QoL. In general, family functioning was found to be a significant predictor of the QoL total score and the other domains, except physical QoL. The effect of family functioning on social life was only found for the

female, which was also the only domain in which female had a mild advantage over the male across all domains of QoL. This finding suggests that a supportive and secure family atmosphere can provide girls with additional strengths in social competence. Surprisingly, family functioning had a stronger predictive effect on the emotional life of boys. This suggests that parenting styles and parental support may have differential effects on male and female adolescents (Crosnoe, Erickson and Dornbusch 2002). The results of this study also support hypothesis 2.

The results of this study confirm the findings of Western studies about the limited effect of gender and age on adolescent QoL but more importantly, it provided some in relation to the gender specific effects on self-efficacy and mindfulness. Concerning the effects of self-efficacy and mindfulness, this study confirms that both variables were strong predictors of adolescent QoL. This suggests that self-efficacy and mindfulness should be promoted during adolescence because they serve as protective factors in strengthening resilience. Interestingly, self-efficacy had stronger effects than mindfulness among boys, especially on physical health. Mindfulness had stronger effects than self-efficacy on the emotional lives of both sexes and on school life for boys. These gender differences may be attributable to the traditional gender roles that place more pressure on boys to be independent and competitive. From this perspective, a high level of self-efficacy would be an advantage and would predict high scores in overall QoL and in the physical subscale in particular, in which much emphasis is placed on physical strength. In contrast, a high degree of self-efficacy may not contribute to emotional stability or social competence. It is likely that adolescents with strong self-efficacy, particularly boys, may find

themselves in more vulnerable positions in which they face constant challenges to their personal success and self-image. Alternatively, because mindfulness focuses on the regulation of the self and emotions, it may enhance an adolescent's capacity to deal with stress in his or her emotional and school lives. Further studies should attempt to uncover how self-efficacy and mindfulness contribute to well-being differently.

The results of this study confirm that mindfulness has a positive effect on adolescent QoL. However, it should be noted that compared with self-efficacy and many other psychological concepts relating to adolescent development, research on mindfulness in children and adolescents has only been conducted in the past decade, and there are some controversial issues relating to its measurement. The CAMM scale used in this study forms a single factor and does not have the same level of construct validity as the commonly used adult mindfulness scale (Baer et al. 2008). Unlike the GSE, in which every item is positively worded, those in the CAMM are all negatively worded (i.e., "I keep myself busy so I don't notice my thoughts or feelings"). Accordingly, this scale has been criticized for only measuring the negative characteristics of mindfulness, and researchers have suggested that alternative measures should be developed to measure the positive effects of mindfulness on adolescent well-being (de Bruin, Zijlstra and Bögels 2014). Moreover, the effects of mindfulness on adolescent development and social life in different cultures have not been fully investigated. The mean score for CAMM found in this study are lower than those found in a study conducted in the Netherlands, and the difference is close to a value of the SD (de Bruin, Zijlstra and Bögels 2014). Chinese culture and society place strong

emphasis on duties and obligations, and shame and guilt are still commonly used to exercise control over adolescents (Ho, Fu and Ng 2004; Shek and Sun, 2014). Thus, more studies on the effects of mindfulness on adolescent development in different cultures are needed.

Compared with mindfulness, self-efficacy has been considered as an important component in many adolescent prevention programs (Das et al., 2016; Morton and Montgomery, 2013). The P.A.T.H.S. Project is well-known as an evidence-based, universal adolescent program originally designed for junior high school students in Hong Kong (Ma, Shek, & Chen, 2019; Shek & Zhu, 2020). Based on the 15 PYD constructs proposed by Catalano et al. (2004) that includes self-efficacy and spirituality, the project team has developed a 10-hour core program and 20-hour full program for adolescents. The P.A.T.H.S. project has been promoted to Mainland China and is one of successful showcase as translating PYD theories into practice in Chinese societies (for example, Zhu & Shek, 2020).

Initial effort has also demonstrated that mindfulness can contribute to adolescent well-being and apply in intervention programs for adolescents (Kuyken et al., 2013; Schonert-Reichl and Lawlor, 2010). Further studies should include advancing strategies to improve adolescent self-efficacy and mindfulness. The possibility of infusing both components in a single program for improving the adolescent outcomes may also be considered.

Limitations of the study and research implications

This study has a few limitations that require discussion. First, because the sample used in this study

was non-representative, the findings cannot be generalized to all Hong Kong Chinese adolescents. The sample was also relatively small compared to those used in other similar studies. Some of the insignificant results may be attributable to the small sample size. Further studies should use a more rigorous sampling method and a larger sample size to investigate the relationship between adolescent QoL and self-efficacy and mindfulness. Second, because this was a cross-sectional study, the relationships among the variables, particularly among self-efficacy, mindfulness, and adolescent QoL, are only correlational. Further studies should use a longitudinal design so that the causal relationships between these variables can be examined. Researchers should also consider studying the outcomes and mediating effects of self-efficacy and mindfulness on adolescent development programs that include components of self-efficacy and mindfulness. Thirdly, this study was only based on self-reported data. Future studies should consider including proxy ratings from parents and teachers, because their different perspectives would provide additional information about adolescent QoL in different key domains of life. Finally, in the original design, participants would be invited to provide information on health and mental health conditions so that students with chronic coniditions would be excluded for further analyses. However, this question is rejected by one school principal as he worried such personal data is sensitive to students and parents. Previous studies consistently reported that young people with health issues and disabilities had lower levels of QoL and should be studied separately. Further studies should be replicated using different samples so that the QoL of Chinese young people can be understood better.

Conclusion

This study confirms gender as an important factor in adolescent development and a gender specific effect has been found in the role of family functioning, self-efficacy and mindfulness in adolescent quality of life. The potential value of mindfulness in adolescents should be further investigated in view of the small number of previous studies and the possible shortcomings of the existing measure. Based on these advanced findings in adolescent well-being, practitioners should develop strategies to improve self-efficacy and mindfulness in components of preventive and intervention programs.

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