

Thus long and short range planning along with sufficient driving forces are required in quality improvement strategies along with standards and assessment tools¹⁴.

In ill adolescents, HRQoL reports were substantially lower than our healthy sample with statistically significant results. Poorer HRQoL status in ill adolescents is corroborated by previous studies². Ill children have a higher incidence of psychiatric, psychosocial, educational, and emotional problems than have healthy children which affects them regardless of the specific nature of their disease. These include school absence, which potentially compromises school achievement and social relationships; reduced opportunities to take part in sports and social activities; and even changes in family relationships⁴.

Nevertheless, some researchers have found that ill subjects report a better HRQoL that may not seem commensurate with their apparent poor health status¹⁵. This may be due to internal adaptation through which individuals change their internal standards to adapt to their ill health or life's predicament known as "Response shift". As a result of this, subjects report a better HRQoL contrary to what may be expected due to their low health status. This gives rise to "disability or illness paradox"¹⁵ i.e. ill children may report higher HRQoL if either they have never experienced a healthier status or if they have adapted to their current health state leading to higher HRQoL reports in contrast to the poorer score expected by an external observer. Hence, comparison of HRQoL across ill populations may get confounded by disability paradox which needs to be investigated further.

As a result of these findings health related quality of life assessment is becoming increasingly recognized as an important outcome for adolescent patients and their parents³. Due to this, improving HRQoL is the major goal for healthcare and policy decisions².

Analysis of Discriminant Validity of WHOQOL-BREF and Generic Health-Related QoL in North Indian Adolescents.

¹Symbiosis Institute of Health Sciences (SIU), Pune, Maharashtra, India

²Department of Hospital Administration, Sanjay Gandhi Post Graduate Institute of Medical Sciences Lucknow, Uttar Pradesh, India

Abstract: HRQoL is a subjective, self-reported, broad ranging concept that can be utilized to identify vulnerable adolescents through individualized self-report measures. In order to distinguish adolescents with varying levels of HRQoL, it is necessary that the instrument has high discriminant validity. Hence, this study was conducted to evaluate the discriminant validity of WHOQOL-BREF instrument. This cross-sectional study was conducted during 2008 – 2012 on healthy school-going adolescents (10-19 years) from 10 public and 10 private schools of urban Lucknow. Students self-reported their HRQoL through culturally modified WHOQOL-BREF instrument. Data analysis was done at 95% Confidence Interval using Statistical Package for Social Sciences (SPSS. Ver. 11.0 Inc., Chicago, II, USA). Descriptive analysis was done for instrument items, global and domain scores of WHOQOL-BREF. The scores were compared across different variables like age, gender, school type to evaluate discriminant validity of the instrument. Further, mean HRQoL score was dichotomized into a binomial dependent variable (good/poor HRQoL) based on the third quartile of mean HRQoL. Frequency of subjects in the inter-quartile range of dimension-scores were also calculated and compared through Chi-square for linear trend. Mean age of the 525 participating adolescents was 14.04±2.09 years and 52.38% were males. Distribution of HRQoL scores of subjects was negative skewed as expected from a healthy sample. The scores varied significantly (all p-values>0.001) across early, middle and late adolescence as well as across gender. The analysis for family's gross monthly income showed that the instrument discriminated significantly well across the income groups also (p-values > 0.001). **Conclusion-** Thus, the instrument exhibited good discriminant validity in terms of age, gender, school type and family income. As HRQoL is cumulative, focusing on adolescent's HRQoL and its regular monitoring can be an effective measure to prevent their vulnerability for poor HRQoL in adulthood.

INTRODUCTION

Adolescents comprise nearly 22% of Indian population and one fifth of global population which is projected to increase further¹.

Correspondence: Prof. Hem Chandra, Professor & Head, Department of Hospital Administration, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow- 226014 (UP)India. e-mail: hchandra555@gmail.com

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Adolescents are considered to be the healthiest segment of a society owing to their lowest mortality and morbidity rates, due to which sometimes they do not receive the much-deserved attention they need as a separate group^{1,2}. In research they are most often subsumed with adults or with children and are rarely studied as a separate group.

Literature suggests that a Health Related Quality of Life (HRQoL) perspective can assist in identifying vulnerable adolescents through

individualized self-report measures and devising actions for improving dimension-specific HRQoL of target groups³. World Health Organization (WHO) defines HRQoL as “an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns⁶. Thus, HRQoL is a subjective, self-reported broad ranging concept, incorporating in a complex way individuals’ physical health, psychological state, level of independence, social relationships, personal beliefs and their relationships to salient features of the environment of home or school^{2,6}.

METHODS

This was a cross-sectional study conducted during 2007 – 2010 on healthy school-going adolescents studying in 10 public and 10 private schools of urban Lucknow. The culturally modified WHOQOL-BREF⁷ was used for HRQoL assessment. Inclusion criteria was age of subjects between 10 to 19 years, written informed consent from parents, oral assent from the subject, and ability of subject and their parents to read or understand either Hindi or English. The subjects not falling in inclusion criteria or whose parents refused for their child’s participation were excluded from the study. To calculate

Table 1: Item Descriptive Statistics of subject’s self-report (n=525) of WHOQOL-BREF items

| Item | Mean | SD | Skewness | Kurtosis |
|---|------|------|----------|----------|
| 1. How would you rate your quality of life? | 4.06 | 0.72 | -0.3 | -0.2 |
| 2. How satisfied are you with your health? | 3.86 | 0.88 | -0.63 | 0.35 |
| 3. To what extent do you feel that physical pain prevents you from doing what you need to do?* | 2.34 | 1.03 | 0.49 | -0.35 |
| 4. How much do you need any medical treatment to function in your daily life?* | 1.87 | 0.93 | 0.85 | 0.1 |
| 5. How much do you enjoy life? | 3.85 | 0.97 | -0.57 | -0.3 |
| 6. To what extent do you feel your life to be meaningful? | 3.87 | 0.92 | -0.53 | -0.23 |
| 7. How well are you able to concentrate? | 3.66 | 0.91 | -0.35 | -0.23 |
| 8. How safe do you feel in your daily life? | 3.91 | 0.88 | -0.63 | 0.27 |
| 9. How healthy is your physical environment? | 3.78 | 0.91 | -0.33 | -0.51 |
| 10. Do you have enough energy for everyday life? | 4.09 | 0.88 | -0.8 | 0.27 |
| 11. Are you able to accept your bodily appearance? | 4.11 | 0.97 | -0.87 | -0.07 |
| 12. Have you enough money to meet your needs? | 3.52 | 1.22 | -0.35 | -0.83 |
| 13. How available to you is the information that you need in your day-to-day life? | 3.78 | 0.95 | -0.4 | -0.46 |
| 14. To what extent do you have the opportunity for leisure activities? | 3.33 | 1 | 0.01 | -0.62 |
| 15. How well are you able to get around? | 3.82 | 1.05 | -0.7 | -0.07 |
| 16. How satisfied are you with your sleep? | 3.97 | 0.92 | -0.82 | 0.47 |
| 17. How satisfied are you with your ability to perform your daily living activities? | 4.04 | 0.79 | -0.73 | 0.97 |
| 18. How satisfied are you with your capacity for work? | 4.02 | 0.89 | -0.83 | 0.4 |
| 19. How satisfied are you with yourself? | 4.11 | 0.91 | -1.01 | 0.95 |
| 20. How satisfied are you with your personal relationships? | 4.14 | 0.83 | -0.8 | 0.47 |
| 21. How satisfied are you with the respect you receive by others? | 4.11 | 0.85 | -0.97 | 1.01 |
| 22. How satisfied are you with the support you get from friends? | 4.11 | 0.88 | -0.98 | 1.16 |
| 23. How satisfied are you with the conditions of your living place? | 3.97 | 0.9 | -0.95 | 0.76 |
| 24. How satisfied are you with your access to health services? | 4.02 | 0.85 | -0.7 | 0.42 |
| 25. How satisfied are you with your transport? | 3.92 | 0.97 | -0.7 | 0.37 |
| 26. How often do you have negative feelings such as blue mood, despair, anxiety, and depression?* | 2.11 | 0.81 | 0.63 | 0.6 |
| Physical Domain | 74 | 14 | -0.54 | 0.31 |
| Psychological Domain | 72 | 15 | -0.46 | -0.21 |
| Social relations Domain | 78 | 17 | -1.09 | 2.02 |
| Environmental Domain | 69 | 16 | -0.34 | -0.13 |
| Global HRQoL | 3.95 | 0.67 | -0.38 | 0.17 |

* Negatively scored items

sample size we assumed that if number of adolescent students (age between 10-19 yr) in 20 schools of Lucknow is 12,000, then to detect a mean HRQoL score of 50% at a desired precision of 10% and 95% confidence level, minimum sample size for the study was computed as 372.

Lucknow city was divided symmetrically into two halves (Northern and Southern) based on the city map and five public and five private schools were purposively selected from each half making a total of 10 public and 10 private schools from Northern and Southern Lucknow. Purposive selection was done to select schools catering to different socio-economic strata of community while ensuring representation of major localities so that the selected schools represent the general population of schools in the city. Written permission from the school principals obtained on official letter by the investigator, was the inclusion criteria for schools. Students self-reported their HRQoL through culturally modified WHOQOL-BREF instrument.

Data was computerized in a customized database and score calculation of WHOQOL-BREF was done as per the standard procedure defined in WHOQOL user manual⁸. Data analysis was done using Statistical Package for Social Sciences (SPSS. Ver. 11.0 Inc., Chicago, IL, USA). Statistical analysis was performed at 95% Confidence Interval and results with p -value < 0.05 were considered statistically significant. Descriptive analysis was done for instrument items, global and domain scores of WHOQOL-BREF. The four domain scores of WHOQOL-BREF were averaged to obtain mean HRQoL score for each subject. The scores were compared across different variables like age, gender, school type to evaluate discriminate validity of the instrument. Further, mean HRQoL score was dichotomized into a binominal dependent variable (good/poor HRQoL). Good HRQoL was defined as the score above the third quartile of mean HRQoL and poor HRQoL as the score below the third quartile. Frequency of subjects in the inter-quartile range of dimension-scores were also calculated and compared through Chi-square for linear trend.

RESULTS

Mean age of the 525 participating adolescents in the study was 14.04 ± 2.09 years and 52.38% were males. Item-descriptive analysis of WHOQOL-BREF instrument (Table 1) showed that the mean of item scores (scored on 1-5 Likert scale) ranged from 3.33 ± 1 to 4.14 ± 0.83 . Means and standard deviation (SD) of the four domain scores (score range 0-100) were: Physical domain (74.04 ± 14.38), Psychological (72.9 ± 15.04), social relations (78.04 ± 17.03) and environment (69.48 ± 16.38). Mean of global QoL was 4.06 ± 0.72 , global health was 3.86 ± 0.88 and global HRQoL was 3.95 ± 0.67 .

Figure 1 shows the distribution of HRQoL scores of subjects which was a bell-shaped curve. The distribution has negative skewness which is expected from a healthy sample. 178 (33.9%) out of 525 subjects had HRQoL score in between 71 to 80.

DISCRIMINANT VALIDITY

The results showed that the instrument discriminated well across the three age groups indicating a significant difference in physical and psychological dimensions with increasing age during adolescence. As the age group increased from 10-13 years to 14-16 years, physical HRQoL declined from 75 ± 13 to 73 ± 13 , but as age increased above 17 years, physical HRQoL rose back to 75 ± 15 , thus remaining more or less constant across the three age groups. In psychological domain, HRQoL was 75 ± 15 (10-13 years) which reduced to 71 ± 15 (14-16

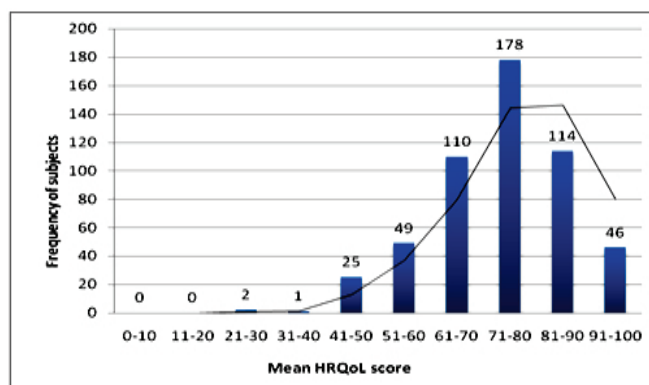


Figure 1: Distribution of HRQoL scores of subjects (n=525)

years) and further declined to 70 ± 13 (>17 years) with all p -values > 0.001 . However, the results were not significant for social relations and environment domains.

The gender-wise analysis revealed that females perceived a significantly better HRQoL in psychological domain (female- 75 ± 14 , male- 70 ± 14 , p -values < 0.001) as well as social relations domain (female- 81 ± 14 , male- 75 ± 18 , p -values < 0.001), whereas the results were not significant for physical and environment domains. The analysis of discriminate validity for school type shows that subjects studying in private schools reported a significantly better HRQoL in all dimensions compared to subjects studying in public schools (p -values < 0.001).

The analysis for family's gross monthly income showed that the instrument discriminated significantly well across the four income groups (p -values < 0.001). However, the pattern of variation in HRQoL amongst the income groups was not identical. In both physical and psychological domain when the family income (in INR) rose from $< \text{Rs. } 5000$ to the income group $5001-15000$, HRQoL showed an increase from 69 ± 15 in both domains to 75 ± 13 in physical and 75 ± 14 in psychological domain. Although with a further increase of income to the range $15001-25000$, HRQoL declined in psychological domain (74 ± 15) whereas increased in physical domain (78 ± 13). Further increase in income to the range > 25001 showed improvement in psychological domain (76 ± 15) but slight although significant decline in physical domain (77 ± 12). Analysis for social relations domain revealed a significant rise in HRQoL from 75 ± 18 to 79 ± 14 when income group increased from $< \text{Rs. } 5000$ to $5001-15000$ following which it remained constant at 79 ± 14 for all higher income groups. HRQoL in environment domain showed a steep rise from 61 ± 16 to 73 ± 13 with an increase in income from $< \text{Rs. } 5000$ to $5001-15000$, but further increase in income revealed a very little increase in HRQoL from 75 ± 15 ($15001-25000$) to 78 ± 13 (> 25001) with all results significant at p -value < 0.001 .

The frequencies of subjects within the inter-quartile ranges of QoL score for various covariates are shown in Table 2. The inter-quartile ranges have been divided into four categories with column titled as A (QoL score $<$ first Quartile), B (QoL score $>$ first quartile and $<$ second quartile), C (QoL score $>$ second quartile and $<$ third quartile) and D (QoL score $>$ third quartile). Odds Ratio (OR) with 95% confidence intervals and Pearson's chi-square with p -value have been reported for B vs. A, C vs. B and D vs. C. Chi-square for linear trend is reported for comparison across these four categories of each covariate.

Table 2: Frequency of subjects (n, %) for dichotomous covariates in the Inter-quartile ranges of QoL scores

| | (A) Score <Q1(<66) (n,%) | (B) Score ≥Q1 and <Q2 (≥66 to ≤75) | (C) Score ≥Q2 and <Q3 (≥76 to ≤82) | (D) Score ≥Q3 QoL ≥83 | OR (C and B) (95% CI), Pearson's Chi (p-value) | OR (D and C) (95% CI), Pearson's Chi (p-value) | Chi-square Linear trend (p-value) | Total for |
|--|--------------------------------|--|--|-----------------------------|--|---|---|--------------|
| 1. Age | ≥10 - ≤13 | 49 (21.6) | 52 (22.9) | 67 (29.5) | 0.97 (0.59 - 1.60), 0.01 (0.92) | 1.44 (0.88 - 2.36), 2.2 (0.14) | 11.73 (0.008) | 227 |
| | ≥14 - ≤19 | 99 (33.2) | 67 (22.5) | 58 (19.4) | | | | 298 |
| 2. Gender | Male | 82 (29.8) | 52 (18.9) | 67 (26.8) | 0.45 (0.27 - 0.75), 9.57 (0.001) | 0.49 (0.29 - 0.81), 8.02 (0.004) | 12.64 (0.005) | 275 |
| | Female | 49 (19.6) | 66 (26.4) | 67 (26.8) | | | | 250 |
| 3. Number of siblings | ≤1 | 77 (31) | 71 (25.6) | 61 (24.6) | 2.94 (1.74 - 4.99), 16.57 (0.000) | 4.2 (2.48 - 7.11), 29.9 (0.000) | 33.66 (0.000) | 248 |
| | ≥2 | 98 (35.4) | 71 (25.6) | 58 (20.9) | | | | 277 |
| 4. Birth Order | First | 47 (21) | 66 (29.5) | 54 (24.2) | 1.52 (0.91 - 2.52), 2.64 (0.10) | 1.48 (0.9 - 2.45), 2.41 (0.12) | 3.73 (0.29) | 223 |
| | ≥2 | 86 (28.5) | 82 (27) | 65 (21.5) | | | | 302 |
| 5. Class | ≥VI - ≤VIII | 51 (22.8) | 51 (22.8) | 55 (24.6) | 1.38 (0.83 - 2.28), 1.6 (0.21) | 1.8 (1.09 - 2.95), 5.43 (0.02) | 10.95 (0.01) | 223 |
| | ≥IX - ≤XII | 82 (27) | 97 (32) | 64 (21.2) | | | | 302 |
| 6. School category | Public | 98 (36.3) | 75 (27.7) | 54 (20) | 0.37 (0.22 - 0.61), 15.67 (0.000) | 0.19 (0.11 - 0.32), 40.12 (0.000) | 42.66 (0.000) | 270 |
| | Private | 35 (13.7) | 73 (28.6) | 65 (25.5) | | | | 255 |
| 7. Father's Education | ≤ High School | 43 (35.5) | 43 (35.5) | 23 (19) | 0.86 (0.51 - 1.42), 0.35 (0.55) | 0.22 (0.11 - 0.44), 19.85 (0.000) | 23.15 (0.000) | 121 |
| | ≥ Intermediate | 90 (22.2) | 105 (25.9) | 96 (23.7) | | | | 404 |
| 8. Mother's Education | ≤ High School | 73 (37.2) | 59 (30.1) | 37 (18.9) | 0.54 (0.34 - 0.87), 6.35 (0.01) | 0.23 (0.13 - 0.39), 30.08 (0.000) | 33.13 (0.000) | 196 |
| | ≥ Intermediate | 60 (18.2) | 89 (27) | 82 (24.9) | | | | 329 |
| 9. Family type | Nuclear | 96 (26.4) | 96 (26.4) | 81 (22.3) | 0.71 (0.43 - 1.18), 1.73 (0.19) | 0.99 (0.57 - 1.71), 0 (1) | 2.38 (0.49) | 363 |
| | Joint | 37 (22.8) | 52 (32.1) | 38 (23.4) | | | | 162 |
| 10. Family size | ≤4 | 27 (19) | 36 (25.3) | 33 (23.2) | 1.51 (0.84 - 2.7), 1.91 (0.16) | 2.29 (1.31 - 4), 8.65 (0.003) | 9.68 (0.02) | 142 |
| | ≥5 | 106 (27.6) | 112 (29.2) | 86 (22.4) | | | | 383 |
| 11. Family's gross monthly income | ≤ 8000 | 93 (34.3) | 85 (31.3) | 49 (18.1) | 0.3 (0.18 - 0.51), 21.1 (0.000) | 0.23 (0.14 - 0.39), 31.2 (0.000) | 38.54 (0.000) | 271 |
| | > 8000 | 40 (15.7) | 63 (24.8) | 70 (27.5) | | | | 254 |
| Total | 133 | 148 | 119 | 125 | | | | 525 |