Research

Health related quality of life in pregeriatric patients with chronic diseases at urban, public supported clinics

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Abstract

Background: Understanding health-related quality of life (HRQOL) leads to more effective and focused healthcare. America's growing health disparities makes it is increasingly necessary to understand the HRQOL of pregeriatric individuals who are now 55–64 years old, i.e. before they are eligible for federally mandated health care at age 65. Our study measured the self-perceived HRQOL of pregeriatric, poor patients with multiple chronic diseases treated at 2 public clinics.

Methods: Consecutive patients aged 55–64 years, many with multiple chronic diseases, responded in an interview to the 36-Item Short-Form Health Survey (SF–36) as a general measure of HRQOL during a regular visit to one of two university-staffed urban public clinics.

Results: The perceived physical and mental functioning of 316 pregeriatric patients was tabulated from SF–36 scores to yield their HRQOL. Their scores were statistically significantly lower than those of the general US pregeriatric population and lower than averages for US patients with multiple chronic diseases. All eight subscale scores of SF–36 were 16% to 36% lower compared with the averages of the general US pregeriatric population. Further, as the number of chronic diseases increased, the lower was the HRQOL. Lower physical and mental scores were associated with a lower income, unemployment, and higher numbers of multiple chronic diseases.

Conclusion: Chronic diseases have a powerful negative impact on perceived mental and physical functioning in pregeriatric patients. HRQOL information can assist health care providers to gain a more complete picture of their pregeriatric patients' health.

Background

Studies have shown that the way patients view their personal quality of health and functioning can help medical researchers and practitioners understand the degree to which medical decisions are effective and the desired health outcomes are achieved [1–5]. Furthermore, patients' perceptions of their own physical health may serve as an indicator of their underlying emotional distress and may even be an independent predictor of loss of functioning, mortality, and health care use [6–11].

Patients' perceptions of their poorer mental and physical functioning, that is, their perceptions of health related quality of life (HRQOL) correlated with the following fac-

tors: socioeconomic status (SES), minority ethnic background, gender, and increased age in the presence of disease [12,13]. By most measures, African-Americans and Hispanics, who have a low SES, experience worse health than both general and elderly populations. Many elderly people in these populations are more likely to suffer from at least one of the following chronic illnesses: diabetes, arthritis, hypertension, hearing impairments, and heart disease [14–17]. They are less likely to have health insurance, more likely to be unemployed, and more likely to experience greater barriers in accessing health care than the general population [15,17]. As a result of these disparities, these individuals have a lower HRQOL [18–21]. It has been reported that people with self-perceived poor HRQOL have increased mortality risks 2 to 7 times greater than those of people with self-perceived excellent health [22–24].

Because a large segment of the American population is becoming elderly and the aging minority population is growing, it is necessary to understand the HRQOL of individuals who are now 55–64 years old and will soon be considered senior citizens. In contrast to previous HRQOL reports for average patients, we undertook this study to focus specifically on the patient group aged 55–64 years and with at least one chronic disease.

Methods
Subjects
Consecutive patients 55–64 years old whose medical charts reflected an ICD-9 code for at least one chronic disorder, and who were seen from June 2001 through August 2001 in one of two large publicly supported county clinics in Houston, Texas, were eligible for the study. Patients seen at Clinic 1 live in a highly dense population of approximately 2,453 persons per square mile, considerably higher than the average population density of the county [25]. The population was a predominately Hispanic (56%), with 34% non-Hispanic whites, 6% African-Americans, and 4% of other ethnicities. Patients seen at Clinic 2 came from a less densely populated low-income neighborhood in northeast Houston [26]. The population is 31% Hispanic, 35% non-Hispanic whites, and 27% African-American.

Measures
HRQOL is a broad concept encompassing a person's perceived functional status, sense of well-being, and access to health resources and opportunities. To measure it, we selected one of the most widely used surveys, namely, the 36-Item Short-Form Health Survey (SF–36) [27]. The SF–36 measures HRQOL with eight subscales in the form of 36 questions. Measurements result in two major summary scores, the physical component summary score (PCS) and the mental component summary score (MCS). Three sub-

scales (physical functioning, role-physical, and bodily pain) correlate most highly with the physical component and contribute most to the scoring of the PCS. Three subscales (mental health, role-emotional, and social functioning) contribute most to the scoring of the MCS. Three of the subscales (vitality, general health, and social functioning) contribute to both the PCS and the MCS summary scores. The validity of the SF–36 subscales and summary scores have been extensively tested in relationship to clinical indicators such as the presence or absence of diseases, the severity of diseases within a particular category, and the changes in disease related symptoms over time [28–31]. We also collected demographic information on sex, date of birth, ethnicity, educational level, and household income. Information regarding the number and identity of the patient's chronic diseases were gathered from the patient's medical chart.

Procedure
This study was approved by The University of Texas Medical School at Houston internal review board. The medical directors of the two clinics were responsible for overseeing the project. Patients were available for the study after their clinic physicians referred them during regular clinic visits. However, referred patients were eligible for the study only after we confirmed from their medical charts their age to be 55–64 years and an ICD-9 code for at least one chronic disease. Prior to enrolment in the study, participants gave written informed consent to participate. Participants then were given a 15-minute interview. During the interview, the participants completed the SF–36, in either English or Spanish, according to their preference to avoid response biases due to language and differences in reading levels in a population that included recent immigrants and individuals with little formal education. After the interview, all responses were entered into a personal computer, using Statistical Package for the Social Sciences (SPSS) version 10.1 (SPSS Inc., Chicago, IL, USA).

Analyses
Descriptive statistics of the demographic variables by sex and chronic diseases were produced for the sample. The Student's *t* test was used to compare the scores of the subscales of SF–36 and the summarized scores of PCS and MCS of the study population with the national averages of both the pregeriatric population (aged 55 to 64 years old) and the population with chronic diseases, such as diabetes and hypertension. These 2 groups were selected for comparison because our study participants were pregeriatric and the study population suffered from chronic diseases.

Eight subscale scores were produced from the SF–36 surveys and then transformed into a scale ranging from 0 (worst possible health status) to 100 (best possible health status). The PCS and MCS scores were scored by using

Table 1: Demographic characteristics of pergeriatric patients*

Characteristics	Patients			
	All (n = 316)	Men (n = 149)	Women (n = 167)	P Value*
Age, y†	60.3 (4.8)	60.7 (5.4)	60.0 (4.0)	0.16
Ethnicity				0.56
Non-Hispanic White	60 (18.9)	26 (17.4)	34 (20.4)	
African-American	167 (52.8)	76 (51.0)	91 (54.5)	
Hispanic	82 (25.9)	42 (28.2)	40 (24.0)	
Others	7 (2.2)	5 (3.4)	2 (1.2)	
US born	266 (84.2)	124 (83.2)	142 (85.0)	0.66
Education level				0.21
Less than high school	100 (31.6)	50 (33.6)	50 (29.9)	
High school	159 (50.3)	77 (51.7)	82 (49.1)	
Some college or higher	57 (18.0)	22 (14.8)	35 (21.0)	
Employed	87 (27.5)	41 (27.5)	46 (27.5)	0.99
Household income level				0.40
≤$ 5,000	58 (18.4)	25 (16.8)	33 (19.8)	
$ 5,000 – $ 10,000	131 (41.5)	61 (40.9)	70 (41.9)	
$ 10,000 – $ 20,000	108 (34.2)	53 (35.6)	55 (32.9)	
>$ 20,000	19 (6.0)	10 (6.7)	9 (5.4)	

* Values are presented as number (percentage) unless otherwise indicated. † Data given as mean (SD).

norm-based methods calculated by using the domain scores and a published scoring algorithm that transformed them into norm-based scores (0–50) [27,32,33]. The advantage of the norm based scoring of the PCS and MCS can be meaningfully compared with the other and the scores have a direct interpretation in relation to the scores in the general US population [32]. The Student's *t*-test was used to compare the scores of the 8 subscales, PCS, and MCS of the study participants and national averages given in the Health Institute's SF–36 comparison manual [27]. Analysis of variance was used for statistical comparison of means and to determine the relationship between multiple chronic diseases and HRQOL scores.

In a final stage of analysis, two multiple regression analyses were performed to further quantify the relationship between the outcome scores and the patients' demographic information. Specifically, the dependent variables, either PCS or MCS, were regressed for sex, age, ethnicity, education, household income, employment, and number of chronic diseases. All variables were entered in the model simultaneously. The statistical analysis was performed with Statistical Analysis System (SAS) Version 8.2 (SAS Institute, Inc., Cary, NC, USA).

Results
A total of 316 consecutive patients aged 55–64 years were asked to participate in the study, and all of them agreed to the interview (100% response rate). Of the participants, 167 (52.8%) were women and 149 (47.2%) were men. All

had low incomes and were of various ethnic backgrounds (Table 1). Nearly 60% of our patients had a household income below $10,000, and 72.5% were unemployed.

As a group, the patients had seven different chronic medical conditions, and 80% of the patients individually had more than one chronic condition. Hypertension, arthritis, and diabetes type 2 were the most frequent chronic diseases in these patients. Overall, the frequency of chronic conditions did not differ between the men and women (Table 2).

Table 3 lists mean scores of the eight SF–36 subscales and their summarized PCS and MCS scores for study participants and the differences of these scores compared with the general US population aged 55–64 years and those of patients with multiple chronic diseases with current physician report of hypertension or diabetes type 2. The scores of every SF–36 domain in pregeriatric patients were statistically significantly lower than those of the general US pregeriatric population (P < 0.01). Pregeriatric study participants' subscale scores were about 16% to 36% lower than the averages for the general pregeriatric population. Further, we selected the general US patients who were about 60 years old and who had multiple chronic diseases along with hypertension or diabetes type 2 for comparison. We intended to compare the HRQOL of our patients to the HRQOL of the general US patient population with hypertension or diabetes type 2. These diseases were chosen because they were the 2 major chronic dis-

Table 2: Frequency of chronic diseases among pregeriatric patients*

Chronic conditions	Patients			
	All (n = 316)	Men (n = 149)	Women (n = 167)	*P* Value
Chronic diseases				
Hypertension	229 (72.5)	106 (71.1)	123 (73.7)	0.62
Arthritis	165 (52.2)	75 (50.3)	90 (53.9)	0.53
Diabetes type 2	140 (44.3)	70 (47.0)	70 (41.9)	0.36
Heart disease	87 (27.5)	53 (35.6)	34 (20.4)	0.00
Pulmonary disease	37 (11.7)	19 (12.8)	18 (10.8)	0.59
Visual and hearing impairment	163 (51.2)	80 (53.7)	83 (49.7)	0.48
Osteoporosis	17 (5.4)	1 (0.7)	16 (9.6)	0.00
No. of chronic diseases				
1	62 (19.6)	28 (18.8)	34 (20.4)	0.73
2	91 (28.8)	38 (25.5)	53 (31.7)	0.22
3	77 (24.4)	41 (27.5)	36 (21.6)	0.22
4	86 (27.2)	42 (28.2)	44 (26.3)	0.71

* Values are presented as number (percentage).

Table 3: SF–36 quality of life scores in pregeriatric patients compared with national averages for both pregeriatric persons and patients with chronic diseases

Domain			Mean Differences in Scores vs National Averages (95% CI)					
	Score Range	Study Patients (n = 316) Mean (SD)	Pregeriatric (n = 269)†	*P* Value	Hypertension Patients (n = 2,089)‡	*P* Value	Diabetes Type 2 Patients (n = 541)§	*P* Value
Physical function	0–100	55.6 (28.4)	-20.6 (-25.7 to -16.1)	0.00	-17.8 (-30.0 to -14.6)	0.00	-12.1 (-16.1 to -8.1)	0.00
Physical role	0–100	48.3 (31.7)	-25.4 (-31.1 to -19.7)	0.00	-13.7 (-18.3 to -9.1)	0.00	-8.5 (-13.8 to -3.2)	0.00
Body pain	0–100	46.7 (29.2)	-20.8 (-25.3 to -16.3)	0.00	-25.6 (-28.6 to -22.6)	0.00	-21.8 (-25.6 to -18.0)	0.00
General health	0–100	46.4 (24.2)	-18.2 (-22.1 to -14.3)	0.00	-16.9 (-19.3 to -14.5)	0.00	-9.7 (-12.8 to -6.6)	0.00
Physical Component Summary (PCS)	0–50	37.4 (11.7)	-5.9 (-7.8 to -4.0)	0.00	-6.9 (-8.2 to -5.6)	0.00	-4.1 (-5.7 to -2.5)	0.00
Vitality	0–100	46.9 (24.2)	-13.5 (-17.3 to -9.6)	0.00	-11.4 (-14.0 to -8.8)	0.00	-8.8 (-11.9 to -5.6)	0.00
Social function	0–100	61.0 (30.2)	-20.4 (-24.9 to -15.9)	0.00	-25.7 (-28.3 to -23.1)	0.00	-21.0 (-24.8 to -17.2)	0.00
Emotional role	0–100	66.4 (32.7)	-13.9 (-19.3 to -8.5)	0.00	-0.3 (-4.5 to -3.9)	0.89	-9.2 (-14.1 to -4.3)	0.00
Mental health	0–100	63.0 (24.5)	-12.0 (-15.6 to -8.3)	0.00	-5.0 (-7.2 to -2.8)	0.00	-13.7 (-16.6 to -10.8)	0.00
Mental Component Summary (MCS)	0–50	43.9 (13.9)	-8.8 (-10.8 to -6.8)	0.00	-8.3 (-9.5 to -7.1)	0.00	-8.0 (-9.6 to -6.4)	0.00

† Population from Ware et al, ages 55–64 years [27,32]. ‡ Population for patients with five medical conditions: physician report of current patients with hypertension, mean age, 59.1 years [27,32]. § Population for patients with five medical conditions: physician report of current patients with diabetes: age of onset 30 years or older, mean age, 60.2 years [27,32]

eases found among our patients. We found that the our pregeriatric patients' subscale scores of HRQOL were about 0.16% to 35% lower than those of the general US patients with multiple chronic diseases along with hypertension (*P* < 0.01).

Similarly, the subscale scores of HRQOL of our patients was 12% to 31% lower than that of the general US patients with multiple chronic diseases along with diabetes type 2 (*P* < 0.01). The number of chronic diseases and the scores of the eight subscales of SF–36 and their summarized PCS and MCS were inversely related (Figure 1).

ANOVA analyses show that the chronic diseases were significantly related to the scores of these eight subscales and summarized scales (between groups, *P* < 0 .01). In other words, the patients with more accumulated chronic diseases were more likely to have lowered self-perceived physical and mental health function measured by SF–36.

Multiple regression analyses assessed the impact of six demographic characteristics and the number of chronic diseases of pregeriatric patients on their PCS and MCS scores (Table 4). As shown in Table 4, in the first regression model, PCS score showed a statistically significant
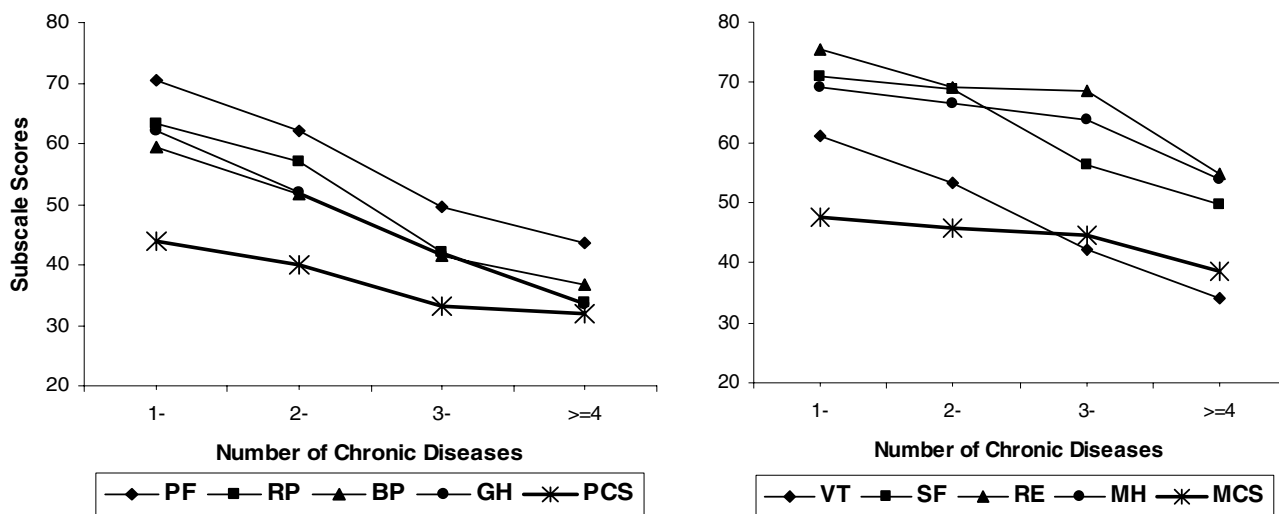
Figure 1
The effect of chronic diseases on patients' physical and functional well-being measured by SF-36. * 8 subscale scores (range: 0 to 100) of SF–36: physical functioning (PF), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE), mental health (MH). The standardized and norm-based scores of physical component summary (PCS) and mental component summary (MCS) range from 0 to 50.

association with sex, employment status, and the number of chronic diseases (for all, $P < 0.01$). Specifically, a lower PCS score was significantly associated with characteristics of being a man, unemployed, and having more chronic diseases. In the second regression model we found significant associations among the following variables: sex, employment status, household income level, number of chronic diseases, and MCS (for all, $P < 0.01$).

Specifically, the lower MCS score was significantly associated with characteristics of being a woman, unemployed, having a lower household income level, and having more chronic diseases. Age, ethnicity, and education level had no significant association with either PCS or MCS scores in this population. Overall, lower PCS and MCS scores are associated with a greater number of chronic diseases, but this association is much smaller for MCS than for PCS.

Discussion
This study provides baseline data of the HRQOL of low-income pregeriatric patients with chronic medical conditions-data that can serve as the basis for future comparative studies, interventions, and policy changes. Our

findings reveal the powerful negative impact that chronic diseases have upon perceived mental and physical functioning in pregeriatric patients. The large differences in HRQOL that we found between the general populations and the patients whom we assessed suggest that clinic physicians need HRQOL information from interviewing and a tool such as the SF–36 to gain a complete picture of their pregeriatric patients' health.

Our study population had a particularly poor HRQOL. One possible explanation is the significant correlation between SF–36 scores and SES. Specifically, lower PCS and MCS scores on the SF–36 were associated with a lower household income level and unemployment. This trend intensifies when individuals have more than one socioeconomic risk and/or when they have multiple chronic diseases. Indeed, pregeriatric patients' scores ranged from about 18% to 30% lower than those for the pregeriatric population. Our findings agree with earlier research studies that have reported disparities between the health status of persons with a lower SES or with chronic conditions and the health status of the general population [13,14,31]. These results are a warning that these patients

Table 4: Multiple regression analysis of demographic characteristics and numberof chronic diseases on the physical component summary(PCS) and physical component summary (MCS) from the SF–36 survey

Independent Variables	Dependent Variables			
	PCS Estimate (95% of Confidence Interval)	P Value	MCS Estimate (95% of Confidence Interval)	P Value
Sex				
Women	Reference		Reference	
Men	-3.02 (-0.64 to -0.54)	0.01	-4.78 (7.80 to 1.76)	0.00
Age				
<60 yr	Reference		Reference	
>60 yr	1.08 (-1.36 to 3.52)	0.38	-0.89 (-3.99 to 2.20)	0.57
Ethnicity				
Caucasian	Reference		Reference	
African American	0.92 (-2.26 to 4.11)	0.57	-0.64 (-4.67 to 3.40)	0.76
Hispanic	2.99 (-0.70 to 6.68)	0.11	-0.06 (-4.74 to -4.62)	0.98
Education				
Above High School	Reference		Reference	
Less High School	-1.08 (-2.65 to 4.80)	0.57	-2.84 (-1.88 to 7.57)	0.27
High School	-0.09 (-3.39 to 3.21)	0.96	-2.37 (-1.81 to 6.55)	0.27
Income (Household)				
≤$ 5,000	Reference		Reference	
$ 5,000–$ 10,00	-0.20 (-3.21 to 3.60)	0.91	-5.11 (0.79 to 9.43)	0.02
>$ 10,000	-2.84 (-0.59 to 6.26)	0.11	-5.07 (0.72 to 9.41)	0.02
Employment				
Yes	Reference:		Reference:	
No	-5.66 (-8.39 to -2.93)	0.00	-4.23 (-7.69 to -0.76)	0.01
No. of chronic diseases				
1	Reference		Reference	
2	-3.04 (-6.53 to 0.46)	0.09	-1.14 (-5.57 to 3.29)	0.61
3	-8.53 (-12.18 to -4.87)	0.00	-2.77 (-7.40 to -1.86)	0.24
4	-9.44 (-13.01 to -5.80)	0.00	-8.49 (-13.09 to -3.88)	0.00
R^2*	0.23	0.00	0.13	0.00

* Square of correlation coefficient (R).

with multiple chronic conditions and significantly lower HRQOL we measured are at risk for increased mortality, in keeping with similar earlier studies [22,23]. Such risk may play as much a role in a person's health status as the standard factors of nutrition, genetics, and the environment [34–36].

Our study method of using individual interviews provided a handy way of gathering demographic and health perception data from individuals with different ethnic backgrounds and reading levels. A previous report noted a difference between information gathered from interviews and self-reported data [37]. However, such difference seen in our study was very small and can be neglected when it was compared with the large differences between the study population and the general comparison populations.

Our study also resulted in identifying specific effects of chronic diseases within this pregeriatric age group,

namely, that the number of chronic diseases is more strongly predictive of the level of a pregeriatric patient's perceived physical health than perceived mental functioning as shown in table 4. Unlike the results of other studies, we did not find that the age of the patients had an independent, negative effect on functional status [38]. This may be due to the fact that we studied a very narrow age range (55–64) of study participants. Similarly, the sample size of each minority subpopulation (e.g., Hispanic or African-American) may not have been large enough to show any statistically significant differences among ethnic groups.

A limitation of the study was our use of consecutively referred patients rather than a random sampling due to time constraints. Thus the patients may not be representative of all pregeriatric patients in this population. Additionally, despite the firm statistical significance of our findings, it is still desirable to confirm the results with a larger and more diverse patient population. Such a group

might include homebound patients. In future studies, we shall also conduct prospective follow-up with patients to determine the ability of the SF–36 to predict patient outcomes.

Conclusion

The purpose of this study was to assess the perceived HRQOL in pregeriatric patients with multiple chronic diseases in our public-supported clinics. The study provides important baseline information about patients whose measured HRQOL and socio-economic status may make them particularly vulnerable to high morbidity and mortality. The degree to which the patients perceived their HRQOL as poor, as compared to national populations, was greater than expected. As a result, we believe that assessing HRQOL is a necessary prerequisite to managing healthcare, bearing in mind that an important objective of healthcare in the US is to increase the length of life while maintaining each person's optimal quality of life [24]. By adding an HRQOL measure to the usual patient interview and laboratory data gathered during patient encounters, physicians may gain useful knowledge about their patients and of the risks that their patients face.

Authors' contributions

LC participated in the design of the study and the statistical analysis and preparation of the manuscript.

SC participated in the design of the study and implemented the survey in the clinics and preparation of the manuscript.

CD participated in the study survey and preparation of the manuscript.

DW participated in the study survey and preparation of the manuscript.

KMN participated in the patient interview and preparation of the manuscript.

LZN participated in the design of the study and oversaw the analysis of the results and preparation of the manuscript.

All authors read and approved the final manuscript.

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