The determinants of self-reported health-related quality of life in a culturally and socially diverse South African community

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Objective To determine factors predictive of the score on the visual analogue scale (VAS) of the EQ-5D questionnaire.

Methods The responses of 1159 residents of a socially and ethnically diverse suburb of Cape Town, South Africa, to the EQ-5D questionnaire were analysed using forward stepwise multiple regression. The variables entered included ethnic group, religious affiliation (Christian or Muslim), income level, unemployment, recent illness or disability and each level of the five EQ-5D domains.

Findings The model developed accounted for an adjusted r^2 of 0.234 and included 11 variables. In addition to the EQ-5D domains, the presence of a disability, an income of less than US$ 420 per month, unemployment and age in years were significant predictors of VAS score.

Conclusion The substantial contribution of health state to the VAS indicates that it is a valid measure of health-related quality of life (HRQoL) across population groups. However, the subjects with lower social status reported a worse HRQoL than their health state alone warranted and this variable might need to be taken into account if the VAS is to be used to compare health states across populations. This paper provides empirical evidence of how HRQoL is perceived by different socioeconomic, cultural, ethnic and religious communities within a developing country.

Keywords Quality of life; Health status; Health status indicators; Pain measurement; Self disclosure; Socioeconomic factors; Cultural characteristics; Regression analysis; South Africa (*source: MeSH, NLM*).

Mots clés Qualité vie; Etat sanitaire; Indicateur état sanitaire; Evaluation douleur; Ouverture personnelle; Facteur socio-économique; Mœurs; Analyse régression; Afrique du Sud (*source: MeSH, INSERM*).

Palabras clave Calidad de vida; Estado de salud; Indicadores de salud; Dimensión del dolor; Autorrevelación; Factores socioeconómicos; Características culturales; Análisis de regresión; Sudáfrica (*fuente: DeCS, BIREME*).

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Introduction

Improving the quality of life is often the major goal in the provision of health care (*1*) and clinicians and policy-makers recognize the importance of measuring health-related quality of life (HRQoL) in informing patient management, policy decisions (*2*) and resource allocation (*3*). One of the most commonly used measures of HRQoL is the EQ-5D (*4*) — a generic, single index measure, validated in several European countries, which has been used to measure health both for clinical and economic appraisal. The EQ-5D includes a description of the respondent's health with respect to five domains of function: mobility, self-care, usual activities (work, study, housework, family or leisure), pain/discomfort and anxiety/depression. Each domain is subdivided into three categories so that the respondent can indicate whether he or she perceives no problem, a moderate problem or an extreme problem. The instrument includes a visual analogue scale (VAS) on which respondents rate their own health (*4*).

This instrument has been validated in a wide range of settings, including in South Africa and Zimbabwe (*5, 6*) and for patients with several different medical conditions, such as arthritis and cancer (*7*). There are both Afrikaans and Xhosa versions of the questionnaire that are recognized by the Euro-QoL Group as being official translations.

Concern has been expressed that self-reported health states and evaluation of one's own health state cannot be compared across populations as they are "complex functions of socio-demographic variables including education, household income, contact with health services and cultural conceptions of health" (*8*). Family beliefs and religion, for example, have been found to contribute significantly to the expression of certain aspects of HRQoL, such as pain (*9*). Consequently the objective health state of a person might not be the primary variable contributing to that person's perception of health state. The question then becomes to what extent the VAS score is a "true" reflection of the health state and to what extent is the score determined by other non-health-related variables. There has been little research on the impact of socioeconomic and other demographic factors on perception of health state and further research is therefore needed (*10*).

The aim of this study was to examine the determinants of self-reported HRQoL among the residents of Woodstock,

a well-established suburb of Cape Town, South Africa, where different ethnic and religious groups live side by side. In 1996 Woodstock had 14 496 residents, mostly of mixed or of European ancestry. The major religious groups were Muslims (43%) and Christians (23%) (*11*). The residents live under a wide range of socioeconomic conditions, with family income ranging from none to over US$ 840 per month. The unemployment rate was 5% (compared to a national average of 30–40%) and approximately 1000 residents had no secondary-school education. The specific objectives of the present study were to describe the self-reported HRQoL of people living in Woodstock using the EQ-5D and to determine which variables might be predictive of the score on the EQ-5D visual analogue scale.

Methods
Subjects
All the homes in Woodstock were visited in June and July 2002 and generally one adult from in each house was interviewed (in some cases this was the oldest person present and in others the person who answered the door). All disabled people who were resident in Woodstock were included in the study. There was no one present or physical access to the building was not possible in 1938 of the 3282 homes visited and in the other homes 1344 subjects were present and responded to the door-bell. Of these 5.6% (185) refused to participate after the purpose of the visit was explained to them and the responses of 1159 subjects were therefore included in the analysis.

Measurement instrument and outcomes
The standard EQ-5D questionnaire was used to gather information on HRQoL. Additional information was obtained using questions with pre-coded answers relating to demographic characteristics and health. The subjects were asked to report on whether or not they had a disability, if they had consulted a medical practitioner in the previous 3 months and, if so, to describe the associated health problem. The socioeconomic data collected included information on the monthly income of the household (categorized), whether the participant was gainfully employed and in what capacity, and the number of years of schooling. Participants were given the choice of using the English, Afrikaans or Xhosa versions of the EQ-5D.

Procedure
The questionnaire and procedure were pilot tested in a neighbouring suburb and the questionnaire was subsequently modified to reduce ambiguity in some of the questions on demographic characteristics. The data were collected primarily at weekends and in the evenings by nine different field workers. The home language (mother tongue) of the subject was determined and if that language was English, Afrikaans or Xhosa the interview was conducted in that language. Speakers of other languages were interviewed in English. The respondents were given a copy of the questionnaire, which was simultaneously read out to them by the interviewer, who then filled in the questionnaire for the respondents.

Statistical analysis
Descriptive statistics were used to describe the demographic details and health status of the respondents. Multiple linear regression was used with the self-reported VAS score as the dependent variable. Age and number of years of schooling, dummy variables for gender, Christian/Muslim, mixed ancestry/

European ancestry, the four income groups, unemployment, presence of illness or disability and a score of zero (not ticked) or one (ticked) for each level of the five EQ-5D domains were entered. An analysis of variance was carried out to determine whether the mean VAS score differed across different income groups and as the *F* value was found to be significant, the post-hoc Scheffe test was used. The χ^2 test was used to determine whether the number of people reporting disability or illness was distributed equally across different demographic categories.

Ethical considerations
Ethical approval was obtained from the University of Cape Town Medical Ethic Research Committee. Subjects identified as having a specific disability were referred to the physiotherapy department at the Woodstock Hospital if they so wished.

Results
The demographic details of the subjects are given in Table 1. There was a preponderance of females and the mean age of the subjects was 50 years (standard deviation ± 17.8). A total of 6.6% of the subjects refused to answer questions about their ethnicity, while most of those who did answer (93.4%) were of mixed descent. Approximately 60% of the subjects had a family income of less than US$ 420 per month. The subjects were almost equally divided between the Muslim and Christian religions, with a few belonging to neither of these religious groups.

Most subjects were bilingual in English and Afrikaans to the extent that no one language could be identified as being primary. Consequently the language groupings were not found to be of any practical value and were discarded in the analysis. A total of 73 (6.3%) of the subjects reported having a disability and 350 (30.2%) that they had consulted a health practitioner in the previous 3 months. The most common conditions reported are listed in Table 2: apart from influenza, chronic diseases were the predominant conditions leading subjects to consult health professionals.

The health states as described by the EQ-5D descriptors are listed in Table 3. Other data sets are given for comparison, one from the United Kingdom and the other from Zimbabwe (*12*). Slightly more than one-third of the subjects reported problems in the domains of pain/discomfort and anxiety/depression, 20% had some limitation in mobility and 10% had some problems with usual activities. Less than 5% of subjects had problems with self-care. Table 4 shows the 10 most common combined health state descriptors reported. A total of 40% of subjects reported no problems in any domain and 31% reported some problems either in anxiety/depression or pain/discomfort. Eighty per cent of the subjects reported one of the ten most common combinations. The frequencies of the VAS scores are depicted in Fig. 1. The regression model that was developed accounted for an adjusted r^2 of 0.234 and included 11 variables (Table 5). Apart from the EQ-5D domains, the presence of a disability, an income of less than US$ 140 per month, unemployment and age in years were significant predictors of VAS score.

The analysis of variance indicated that there was a significant difference in mean VAS score between the two lowest and two highest income groups ($F = 16.7$; $P<0.001$). Subjects in the highest income group had a mean VAS score that was 8.7 greater than those in the lowest group. Cross tabulation indicated that 13% of those in the lowest income group had some disability

Table 1. **Characteristics of the study subjects**

	Frequency
Sex	
Female	667 (57.5)[a]
Male	490 (42.3)
Data missing	2 (0.2)
Total	1159 (100.0)
Ancestry	
Mixed	788 (67.9)
European	192 (16.6)
Indian	41 (3.5)
Black African	29 (2.5)
Refusal to disclose	77 (6.6)
Missing/other[b]	34 (2.9)
Language	
African	12 (1.0)
Afrikaans	148 (12.8)
English	961 (83.0)
European[c]	35 (3.0)
Employment	
Gainfully employed	445 (38.4)
Retired/pensioner	280 (24.2)
Housework	275 (23.7)
Student	65 (5.6)
Seeking work/unemployed	58 (5.0)
Other/missing	17 (1.5)
Disability grant	19 (1.6)
Total	1 159 (100.0)
Income/month (US$)	
Less than 140	343 (29.6)
141–420	343 (29.6)
4211–840	261 (22.5)
>840	145 (12.5)
Missing/refusal/unknown	67 (5.8)
Total	1159 (100.0)
Religion	
Muslim	557 (48.1)
Christian	543 (46.9)
Missing/other[b]	59 (5.1)
Total	1159 (100.0)

[a] Figures in parentheses are percentages.
[b] Includes responses other than those listed and people who refused to respond.
[c] Refers to European languages other than English.

Table 2. **The health conditions most commonly reported by study subjects[a]**

Condition	Frequency
Diabetes	34 (2.9)[b]
Influenza	33 (2.8)
Hypertension	26 (2.2)
Back pain	19 (1.6)
Heart problems	15 (1.3)
Arthritis	13 (1.0)
Bronchitis	13 (1.1)
Chest pain/infection	12 (1.0)
Asthma	10 (0.9)
Cancer	8 (0.7)
Emphysema	8 (0.7)
Psychiatric	8 (0.7)
Osteoarthritis	7 (0.6)
Bladder infection	4 (0.3)
Cataracts	4 (0.3)
Prostate	4 (0.3)
Abscess	3 (0.2)
Stress	3 (0.3)
Tonsillitis	3 (0.3)
Sinusitis	3 (0.3)
Stroke	2 (0.2)
Epilepsy	2 (0.2)
Other	103 (9.7)
Total conditions	234 (21.1)
Health condition not reported	14 (1.3)
Not ill	706 (66.8)
Total	1159 (100)

[a] Conditions reported by two or more subjects.
[b] Figures in parentheses are percentages.

In summary it was found that ethnic group, religious persuasion and gender had no influence on self-reported quality of life. Apart from a recent illness and the EQ-5D descriptors, the major determinants of the VAS score were income, unemployment and age. Most of the subjects with disabilities and who reported recent illness were from the lowest income group. Those of European ancestry were less likely to be disabled and were in higher income groups.

Discussion

Sample
Approximately 8% of the residents of Woodstock participated in the study. Females and Christians were over-represented compared with the findings of the 1996 national census. As reported in other community-based studies (*13, 14*), most of the respondents were female. Employment status and age distribution were similar in Woodstock to those of the general population. There was a higher proportion of Christians in our sample than reported in the 1996 national census but the reason for this finding is not clear.

Disability and ill-health
Surprisingly, more males than females reported disability, whereas in other populations a preponderance of females with

and there was a significant association between disability and income. Subjects of mixed ancestry were more than twice as likely to be disabled as those of European ancestry (*P* = 0.038). There was an association between illness and income group and subjects from the lowest income group were twice as likely to have had a health condition severe enough to warrant a visit to a health professional in the last 3 months than those in the highest income group. No association was found between religious persuasion (Muslim or Christian) and illness or disability. More males than females were disabled (6.9% versus 5.8%) and more females reported recent ill health (31.0% versus 29.0%), but the association was not statistically significant.

Research

Jennifer Jelsma et al.   Self-reported quality of life in South African community

Table 3. **The percentage of responses to each level of five EQ-5D domains by Woodstock residents compared to the responses of samples from Zimbabwe and the United Kingdom[a]**

Dimension	Mobility			Self-care			Usual activities			Pain/discomfort			Anxiety/depression		
Level	Woodst	Zim	UK	Woodst	Zim	UK	Woodst	Zim	UK	Woodst	Zim	UK	Woodst	Zim	UK
No problem	79.3	90.1	82	95.9	96.5	96	87.3	89	84	59.8	69.5	67	63.5	69.3	79
Some problem	20.1	9.7	18	3.1	3.4	4	10.3	10.5	14	34.4	26.3	29	30.1	23.9	19
Severe problem	0.6	0.1	0.1	1.0	0.1	0.1	2.4	0.6	2	5.8	4.2	4	6.3	6.8	2

[a] Woodstock residents (n = 1159); Zimbabwe (n = 1982); United Kingdom (approximately 3000). Woodst = Woodstock ; Zim = Zimbabwe; UK = United Kingdom. Data from ref. 27.

disabilities has been noted (*14–18*). However the difference in proportions was not statistically significant. The responses to the health state descriptors showed a trend similar to that seen in other studies in that there were very few subjects with extreme problems with mobility or self-care (*12, 19*). The reported health states of the Woodstock sample generally resembled those reported in the sample from the United Kingdom more than that from Zimbabwe, possibly because both the first two samples had more elderly subjects than the sample from Zimbabwe. However, the number of subjects in Woodstock who reported moderate or severe anxiety/depression was higher than that in the samples from both the United Kingdom and Zimbabwe. Anxiety and depression were identified as being significant predictors of VAS score (severe anxiety/depression decreased the mean score by 9.3 points). The higher levels of stress in socio-economically deprived populations and the adverse impact of stress on health have been noted elsewhere (*10*).

Determinants of visual analogue scale

In this study, the most important predictors of the VAS score were the health states of the respondents as indicated by scores for the EQ-5D descriptors and the reporting of disability. As has been found elsewhere, the biomedical dimension was central to the perception of health (*20*). However, income group and unemployment emerged as factors independent of one another, although sex, number of years of schooling, ethnic group and religious affiliation did not influence the score. The lack of influence of level of education is in contrast with the findings of a study in the Netherlands that reported not only a worse health state among subjects with lower educational qualifications, but also that perceived general health became worse over time in this group (*10*). This association with education was also seen in an analysis of the 1994–95 National Population Census in Canada that included information on 13 995 respondents aged ≥ 20 years and which found that poorly-educated people had poorer health. The Canadian study concluded that being aged >55 years, female and unemployed were all associated with poor health (*15*).

Woodstock is a well-developed community and the lack of influence of ethnic group and religious persuasion on reporting of VAS could in part be explained by social cohesion, which overrides the effects of these differences. The researchers reported having observed the regular occurrence of social interaction between different economic and ethnic sectors in the community. As was evident from replies to questions relating to the numerical value attached to death (not reported here), religious beliefs play a large role in the life of the community. It is possible that, as found in a study of patients suffering from arthritis (*21*), the fact of affiliation to a religion, regardless of the denomination, might influence perceived quality of life and this needs

Table 4. **The ten health states most frequently reported by Woodstock residents (n = 1159)**

Health state[a]	Frequency	Percentage	Cumulative percentage
11111	452	39.0	39.0
11112	144	12.4	51.4
11121	135	11.6	63.0
11122	88	7.6	70.6
21121	41	3.5	74.1
21111	31	2.7	76.8
21122	28	2.4	79.2
21222	17	1.5	80.7
11113	16	1.4	82.1
21221	13	1.1	83.1

[a] 11111 indicates no problems in any domain; 21221 indicates some problems with mobility, no problems with self-care, some problems with usual activities, some problems with pain/discomfort and no problems with anxiety/depression.

to be explored further. A study on HRQoL among persons living with human immunodeficiency virus (HIV) infection in Hawaii (*22*), reported that the fact of affiliation and having some religious faith, socioeconomic status and health status all contributed positively to the subject's HRQoL. As in the present study, ethnicity and gender were not found to be significant factors in this respect.

As the model developed accounted for only 24% of the variance in scores, there are clearly other factors that influence the VAS score, apart from measurement error, which we did not identify. These may be factors not directly related to health. It is also possible that the EQ-5D does not capture all those elements of HRQoL that are important to the population under study and further study is necessary to identify these domains. Although all language versions of the EQ-5D had been subject to a rigorous translation process, the other elements of the questionnaire were not validated and this might have resulted in some discrepancies in interpretation of questions. Validation of the entire questionnaire is recommended for further studies.

Income

The one variable which consistently emerged as a determinant of reported health state was socioeconomic group. That the legacy of apartheid lives on is evident from the association between ethnic group and income group. It is worth noting that in the years of apartheid, people of mixed descent were discriminated against in favour of those of European ancestry,

Table 5. **Results of the multiple regression analysis**

Visual analogue scale	Unstandardized coefficients B	Standard error	*t*-test	Significance of *t*-value
Constant	85.1	1.4	58.9	0.00
UA Level 3	−9.4	2.9	−3.3	0.00
AD Level 3	−9.3	1.9	−5.0	0.00
UA Level 2	−6.7	1.6	−4.3	0.00
PD Level 3	−6.6	2.0	−3.4	0.00
Presence of disability	−6.4	1.7	−3.7	0.00
Unemployed[a]	−6.2	2.2	−2.8	0.00
Mobility level 2	−3.5	1.2	−2.9	0.00
AD Level 2	−2.7	1.0	−2.8	0.00
Income less than US$ 140 per month	−2.5	0.9	−2.7	0.00
PD Level 2	−2.3	1.0	−2.4	0.00
Age in years	−0.1	0.0	−3.5	0.00

[a] Excluding subjects receiving disability grants. AD = anxiety/depression; PD = pain/discomfort; UA = usual activities.

Fig. 1. **Frequencies of self-reported visual analogue scores of health states (*n* = 1159)**

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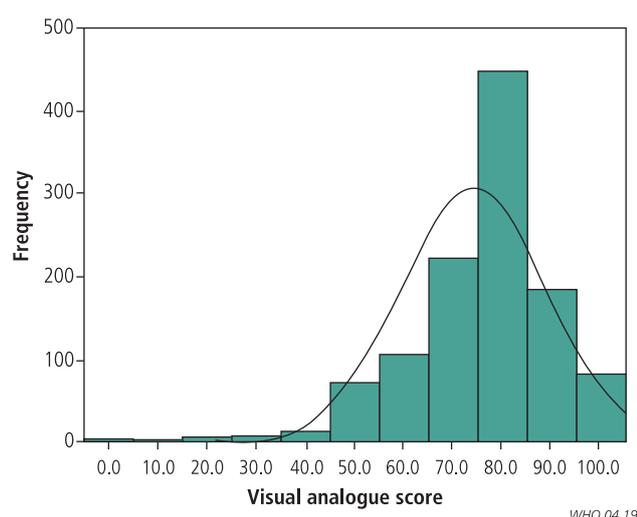
but enjoyed preferential treatment over Black Africans in the employment market. In 1999, about 92% of the population having European ancestry were in the group with the highest standard of living, as opposed to 31% of those of mixed ancestry and 8% of Black Africans (*23*).

At least one-third of the study subjects earned less than the gross national per capita income, which was estimated to be approximately US$ 2520 per year in 2000 (World Bank estimates). However this figure masks enormous inequalities in income distribution and is not very meaningful. Those in the lowest income category (<US$ 140) had a mean VAS score 8.7 points lower than those in the highest income group, and were twice as likely to have had an illness within the previous 3 months that had warranted a visit to a medical practitioner. Approximately two-thirds of those subjects with a disability were in the lowest income group. The higher prevalence of ill-health among poorer populations emerges consistently from other studies (*10, 24, 25*) but the reasons for this finding in the present study are not clear. Access to health care does not seem to be an explanatory factor. There is a hospital in Woodstock

and subjects in the lowest income group reported extensive utilization of health services. An analysis of living conditions, as measured by the number of persons per room did not indicate that there was significantly more overcrowding in this group than in the middle-income groups and tobacco use was equal across income categories (not reported above). Nutrition may play a role, but this was not examined.

Conclusions and recommendations

The lowest socioeconomic group was found to suffer a disproportionately large amount of the illness and disability in this community but, since the reasons for this were not apparent from our study, more research is needed in order to identify possible interventions. The fact that most of the people with disabilities are still in the lowest income group is a cause for concern. South Africa has formulated a National Disability Strategy that aims at the full integration of people with disabilities into society (*26*), but it seems that the policy has either not been implemented or has been unsuccessful up to now. The substantial contribution of health state to the VAS score and the intuitively correct finding that subjects of lower socioeconomic status reported poorer HRQoL lend support to the validity of the VAS as a measure of HRQoL across population groups. However, perceived state of health is not determined solely by the presence of illness or disability in subjects; the contribution made by socioeconomic factors is considerable. These variables might need to be taken into account if the VAS is to be used to compare health states across populations.

This study provides empirical evidence of how HRQoL is perceived by communities with different socioeconomic, cultural, ethnic and religious backgrounds within a developing country. To the extent that some determinants have been found to be universal and applicable to population groups outside the developed world, this research could make a significant contribution to the literature on self-reported HRQoL. ∎

Résumé

Les déterminants de la qualité de vie liée à la santé telle que la signalent les membres d'une communauté sud-africaine culturellement et socialement hétérogène

Objectif Déterminer les facteurs prédictifs du score obtenu sur l'échelle visuelle analogue (EVA) du questionnaire EQ-5D.

Méthodes Les réponses au questionnaire EQ-5D données par 1159 habitants d'une banlieue socialement et ethniquement hétérogène du Cap (Afrique du Sud) ont été analysées à l'aide de la régression multiple par étapes. Les variables retenues étaient l'origine ethnique, l'appartenance religieuse (chrétienne ou musulmane), le niveau de revenu, le chômage éventuel, une maladie ou une incapacité récente et chaque niveau des cinq domaines EQ-5D.

Résultats Le modèle mis au point comportait un r^2 ajusté de 0,234 et incluait 11 variables. Outre les domaines EQ-5D, la présence d'une incapacité, un revenu inférieur à US \$420 par mois, le chômage et l'âge en années étaient d'importants éléments prédictifs du score EVA.

Conclusion Le rôle important de l'état de santé dans l'EVA montre qu'il s'agit là d'une mesure valable de la qualité de vie liée à la santé dans différents groupes de population. Toutefois, les personnes socialement défavorisées signalaient une qualité de vie liée à la santé moins bonne que ne le justifiait leur état de santé et il faudrait peut-être prendre en compte cette variable si l'EVA doit être utilisée pour comparer l'état de santé dans différents groupes de population. Le présent article montre de façon empirique comment la qualité de vie liée à la santé est perçue par différentes communautés socio-économiques, culturelles, ethniques et religieuses dans un pays en développement.

Resumen

Determinantes de la calidad de vida autonotificada en relación con la salud en una comunidad sudafricana cultural y socialmente diversa

Objetivo Determinar los factores predictivos de la puntuación obtenida en la escala visual análogica (EVA) del EQ-5d.

Métodos Se analizaron las respuestas al cuestionario EQ-5d por parte de 1159 habitantes de un barrio residencial social y étnicamente diverso de Ciudad del Cabo, Sudáfrica, usando la técnica de regresión múltiple anterógrada por etapas. Las variables analizadas incluyeron el grupo étnico, la religión (cristiano o musulmán), el nivel de ingresos, la posesión o no de un empleo, la existencia de enfermedad o discapacidad reciente, y cada uno de los niveles de los cinco dominios del EQ-5d.

Resultados El modelo desarrollado se ajustó hasta obtener un r^2 = 0,234 e incluyó 11 variables. Además de los dominios del EQ-5d, fueron factores predictivos significativos de la puntuación de la EVA la presencia de discapacidad, unos ingresos inferiores a US\$ 420 por mes, la condición de desempleado y la edad (años).

Conclusión La sustancial contribución del estado de salud a la puntuación de la EVA indica que ésta es una medida válida de la calidad de vida relacionada con la salud (CVRS) en todos los grupos de población. Sin embargo, las personas con menor estatus social refirieron una CVRS inferior a la que cabía inferir considerando sólo su estado de salud, y es posible que haya que tener en cuenta esta variable si se decide usar la EVA para comparar los estados de salud entre poblaciones. Este artículo aporta datos empíricos acerca de la percepción de la CVRS por parte de diferentes comunidades socioeconómicas, culturales, étnicas y religiosas dentro de un país en desarrollo.

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