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# Quality of life: impacts of a health promotion program in the supplementary health sector

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**Abstract** *The objective of this study was to compare quality of life indicators and clinical parameters among individuals participating in a cardiovascular health promotion program in the supplementary health sector. We conducted a cross-sectional study with 251 program participants living in the regions covered by the Vale do Taquari and Vale do Rio Pardo regional development councils in Rio Grande do Sul, Brazil. Quality of life was assessed using the WHOQOL-BREF questionnaire. Participants were predominantly women and elderly and had high cardiovascular risk (37.8%) and good self-reported quality of life. The clinical parameter means were body mass index obesity class I, normal blood pressure and lipid profile and adequate fasting blood sugar level. The results of the reassessment after one year showed a significant reduction in mean triglycerides ($p = 0.031$), diastolic blood pressure ($p = 0.000$) and systolic blood pressure ($p = 0.013$), and a significant increase in the mean score for the general domain of the WHOQOL-BREF ($p = 0.004$). It is necessary to consider and address social determinants of health and promote integrated actions across various sectors, including both the public and private spheres.*

**Key words** *Health promotion, Quality of life, Chronic diseases, Supplementary health*

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## Introduction

The pace of world population ageing has accelerated in recent decades, particularly in developed countries and developing countries like Brazil. According to the most recent census (2010), the population of persons aged 60 years and above in Brazil was 20,588,890. A large proportion of the older population have multiple chronic diseases, demanding constant care and medication and frequent tests and examinations. Common chronic diseases include hypertension (53%), arthritis (24%), heart disease (17%), diabetes (16%), and depression (12%), with 69% of the older people having at least one of these conditions[1-3].

The demands of these illnesses create a financial burden, accounting for a significant portion of the total health budget and thus affecting the sustainability of public and supplementary health systems, and negatively affect productivity and quality of life (QoL). In response to this problem, countries have introduced policies and health promotion programs aimed at risk and disease prevention across the lifespan. It is important to highlight that these actions should be tailored to multiple social realities, taking into account the demographic, epidemiological, socioeconomic, and cultural differences that characterize the country[4,5].

In 2011, Brazil launched the "Strategic Action Plan to Tackle Chronic Non-communicable Diseases, 2011-2022". The plan addresses four groups of diseases (cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes) and their common modifiable risk factors (smoking, alcohol abuse, physical inactivity, poor eating habits, and obesity) and defines three core strategies: (a) surveillance, information, evaluation and monitoring, (b) health promotion, (c) comprehensive care for chronic non-communicable diseases[6-9].

Health promotion is a highly complex process and requires health professionals to develop new care strategies through innovation, with an emphasis on the caring dimension[10,11]. In this sense, measuring QoL provides important indicators for planning health actions, insofar as quality of life refers to 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 concerns[12-14].

The use of QoL as a health indicator is still limited, being generally restricted to specific groups and the public health sphere. Save for the information provided by the Supplementary Health Agency (ANS, acronym in Portuguese), less data is available for the supplementary health sector, despite the fact that 27% of the Brazilian population use private health care services[15].

This reality is gradually changing due to increased user demand and the work of the ANS, created in 2000. Through the introduction of specific legislation, the ANS regulates the sector seeking an alignment between public and private health policy. Since 2004, the ANS has been promoting the development of health promotion programs, which, together with new demands, has led to increased investment in health promotion and the provision of comprehensive care to clients[5,16].

The Ottawa Charter, presented at the first International Conference on Health Promotion in 1986, defines health promotion as "the process of enabling people to increase control over, and to improve, their health". Measuring QoL helps to ascertain morbidities, risks, and mental health problems[17]. To guide investment and make an effective contribution to QoL, it is essential to gain an understanding of service users' perceptions.

Within this context, the objective of this study was to compare QoL indicators and clinical parameters among individuals participating in a cardiovascular health promotion program in the supplementary health sector.

## Method

We conducted a cross-sectional study using data from the health records of participants in a private cardiovascular health promotion program at two points in time. The participants enrolled in the program because it was prescribed by their doctor or because they were actively seeking this service. Enrollment was preceded by the application of the short form of the World Health Organization Quality of Life Assessment (WHOQOL-BREF), followed by an individualized treatment plan consisting of different interventions, including multiprofessional consultations, workshops, presentations, group meetings, events, physical activity, and telephone monitoring.

The following inclusion criteria were adopted when selecting the health records: participants who had responded the WHOQOL-BREF at two points in time (upon enrollment and one year after enrollment); and those who had undertaken the global cardiovascular risk assessment proposed by the program. All adults and older

persons met the criteria, resulting in a total of 251 subjects. Individuals aged under 18 years were not included because they had not undertaken a global cardiovascular risk assessment or responded the WHOQOL-BREF.

The health promotion program was implemented in four municipalities in the State of Rio Grande do Sul: Lajeado and Encantado, which are part of the Vale do Taquari Regional Development Council (COREDE/VT), called Region 1 for the purposes of this study; and Santa Cruz do Sul and Venâncio Aires, belonging to the Vale do Rio Pardo Regional Development Council (COREDE/VR), called Region 2 for the purposes of this study.

Region 1 occupies second place in the state's Socioeconomic Development Index (SDI) ranking, standing out in the areas of education and health. Region 2 is characterized by the presence of the tobacco industry and per capita income is greater than in Region 1. All of the municipalities have a high SDI, except Venâncio Aires, which is in the medium index bracket[18].

The following information was taken from the participants' health records: age, sex, body mass index (BMI = kg/m$^2$), lipid profile, fasting blood sugar level (FBS), systolic blood pressure (SBP) and diastolic blood pressure (DBP), cardiovascular risk classification, and the WHOQOL-BREF.

For BMI, we adopted the WHO classification system[9]: underweight (BMI < 18.5 kg/m$^2$), normal (BMI 18.5-24.9 kg/m$^2$), overweight (25-29.9 kg/m$^2$), obese class I (30.0-34.9 kg/m$^2$), obese class II (35.0-39.9 kg/m$^2$), and obese class III (≥ 40.0 kg/m$^2$).

The following variables were analyzed to determine the lipid profile: total cholesterol (TC), low-density lipoprotein (LDL-c), high-density lipoprotein (HDL-c), and triglycerides (TRI). These variables were classified using the cut-off points for the risk of a 10-year major cardiovascular event (coronary artery disease – CAD, cerebrovascular accident – CVA, occlusive peripheral arterial disease, and heart failure) proposed by the Brazilian Guidelines on Dyslipidemias and Atherosclerosis Prevention[19]. Participants with a risk of less than 5% were deemed to be at low risk. Men with a risk of between 5% and 20% and women with a risk of between 5% and 10% were classified as medium risk. Low-risk patients with a family history of early onset of cardiovascular diseases were also classified as medium risk. Men with a risk of > 20% and women with a risk of >10% were deemed to be at high risk.

The following classification was used for TC: high – ≥ 240 mg/dl; borderline – 200-239mg/dl; and desirable – < 200 mg/dl. HDL-c was classified as follows: low – < 40 mg/dl; desirable – > 60 mg/dl. LDL-c was classified as follows: optimal – < 100 mg/dl; desirable – 100-129 mg/dl; borderline – 130-159 mg/dl; high – 160-189 mg/dl; and very high – ≥190 mg/dl. TRI were classified as follows: desirable – < 150 mg/dl; borderline – 150-200 mg/dl; high – 200-499 mg/dl; and very high – ≥ 500 mg/dl.

FBS was classified using the cut-off proposed by the American Diabetes Association[20], where a FBS of < 100 mg/dl is deemed to be optimal. The tests were presented by the users at the assessment and reassessment. LDL-c was calculated using the Friedewald formula (LDL-cholesterol mg/dl = total cholesterol - HDL-cholesterol - Triglycerides/5)[21]. Blood pressure (BP) was classified according to the fourth edition of the Brazilian Hypertension Guidelines[22] as follows: optimal – SBP < 120 and DBP < 80 mmHg; normal – SBP < 130 and DBP < 85mmHg; and borderline – SBP between 130 and 139 and DBP between 85 and 89 mmHg.

QoL was assessed using the WHOQOL-BREF, a generic instrument consisting of 26 items, two of which are general questions (general domain – GD) and 24 grouped into the following domains: physical health (PHD); environment (ED); psychological (PD); and social relationships (SRD)[13]. The questionnaire is scored between zero and 100, where the higher the score the higher the level of QoL. QoL was classified according to the categories proposed by Padrão[23] as follows: very poor (0-20); poor (21-40); neither poor nor good (41-60); good (61-80), and very good (80-100).

The data from the initial assessment and reassessments refer to the periods 1 November 2012 to 31 October 2013 and 1 November 2013 to 30 October 2014, respectively. The data were collected from the system in the month following the reassessment. During the program, the subjects received interventions from a multiprofessional team according to their individual treatment plan and availability (which was not considered by this study), including individual and group consultations, workshops, presentations, telephone monitoring, and physical activity.

The statistical analyses were performed using SPSS 20.0. The data were analyzed using descriptive statistics (means and standard deviations). Student's t-test was used to compare the health parameters and means, adopting a significance level of 5%.

The research proposal was approved by the Santa Cruz do Sul University Research Ethics Committee.

## Results

The mean age of the subjects at the initial assessment was 59 years (±14.2) and 77% of the sample were women. Most of the subjects (58%) had family private health insurance plans.

Table 1 shows the results of the Student's t-test. Mean TRI was desirable in both stages and showed a significant reduction in the reassessment ($p = 0.031$). Mean SBP was normal in both assessments, while DBP was normal in the initial assessment and optimal in the reassessment. The differences in mean SBP and DBP between the assessments were significant ($p < 0.001$ and $p = 0.013$, respectively). The other variables did not show any significant differences between assessments. Mean BMI was obese class I in both assessments.

The results were the same between regions across all variables except BMI and BP, which were classified as overweight and optimal in Region 1 and obesity class I and normal in Region 2 in both the initial assessment and reassessment.

QoL was classified as good and the lowest scoring domains were the GD and PHD. The only domain that showed a significant improvement in the reassessment was GD ($p = 0.004$). The specific domains were also classified as good, with no significant changes being found between assessments, in which the lowest scoring domains were the PHD and PD, respectively (Table 2).

With regard to scores by region, Region 1 obtained higher scores in the GD and ED than Region 2. Once again, the domains PHD and PD obtained the lowest scores in both regions. With regard to age group, the ≤ 40 years and 41-60 years groups obtained the lowest GD scores. The PD in Region 2 stands out in the under 40 years age group. In the initial assessment, this domain was classified as neither poor nor good (59.9 ±17.6), which is the worst QoL score observed in the study. However, this score improved considerably in the reassessment (68.5 ±14.7). The lowest scoring domain in the other age groups was PHD, followed by PD (Table 3).

With regard to sex, women obtained lower scores than men across all domains except the SRD (data not shown).

Subjects with high cardiovascular risk obtained lower scores in the GD and SRD than those at low and medium risk (Table 4). The QoL scores did not show any statistically significant differences across the cardiovascular risk groups, although the majority of domains showed a slight improvement in the reassessment.

**Table 1.** Comparison of the health parameter means between the initial assessment (stage 1) and reassessment (stage 2).

| Variable | Stage 1 $\bar{x}$ (SD) | Stage 2 $\bar{x}$ (SD) | p |
|---|---|---|---|
| BMI | 30.3 (5.6) | 30 (5.3) | 0.340 |
| HDL-c | 56.8 (13) | 54.8 (11.7) | 0.375 |
| LDL-c | 116.6 (30.3) | 113.2 (31.6) | 0.482 |
| TC | 197.3 (36) | 189.8 (36.3) | 0.058 |
| TRI | 122.1 (62.4) | 117.3 (56) | 0.031 |
| FBS | 98.1 (17.4) | 96 (17.8) | 0.974 |
| DBP | 82.6 (11.2) | 79.9 (11.3) | < 0.001 |
| SBP | 125.9 (14) | 125.6 (15) | 0.013 |

$\bar{x}$ : mean; PD: standard deviation; significance level: $p < 0.05$, Student's t-test; BMI = body mass index; HDL-c = high-density lipoprotein; LDL-c = low-density lipoprotein; TC = total cholesterol; TRI = triglycerides; FBS = fasting blood sugar level; DBP = diastolic blood pressure; SBP = systolic blood pressure.

Source: Authors' elaboration.

**Table 2.** WHOQOL-BREF domains and scores from the initial assessment and reassessment.

| WHOQOL-BREF domain | WHOQOL-BREF scores (mean) | | |
|---|---|---|---|
| | Initial assessment $\bar{x}$ (SD) | Reassessment $\bar{x}$ (SD) | p |
| GD | 66.24 (16.12) | 69.13 (15.15) | **0.004** |
| PHD | 66.17 (13.18) | 65.92 (15.53) | 0.799 |
| ED | 71.28 (9.90) | 70.55 (13.68) | 0.447 |
| PD | 68.63 (12.57) | 69.62 (13.73) | 0.317 |
| SRD | 72.54 (13.47) | 71.35 (15.744) | 0.333 |

$\bar{x}$ : mean; PD: standard deviation; significance level: $p < 0.05$, Student's t-test; GD = general domain; PHD = physical health domain; ED = environment domain; PD = psychological domain; SRD = social relationships domain.

Source: Authors' elaboration.

Ciência & Saúde Coletiva, 26(Supl. 2):3599-3607, 2021

**Table 3.** WHOQOL-BREF domains and scores from the initial assessment and reassessment by region and age group.

| Age group | | Initial assessment $\bar{x}$ (SD) | | | Reassessment $\bar{x}$ (SD) | | |
|---|---|---|---|---|---|---|---|
| | | Region 1 | Region 2 | Total | Region 1 | Region 2 | Total |
| ≤ 40 years | N | 8 | 21 | 29 | 8 | 20 | 28 |
| | GD | 68.8 (17.7) | 61.9 (17.9) | 63.8 (17.8) | 59.4 (17.4) | 65.6 (19) | 63.8 (18.4) |
| | PHD | 74.1 (11.7) | 66.8 (17.8) | 68.8 (16.4) | 70.1 (13.4) | 66.6 (18.4) | 67.6 (17) |
| | ED | 79.7 (7.5) | 67.3 (16.5) | 70.7 (15.5) | 74.2 (7.8) | 70.9 (14.6) | 71.9 (13) |
| | PD | 77.6 (12.2) | 59.9 (17.6) | 64.8 (17.9) | 63 (11.9) | 68.5 (14.7) | 67 (13.9) |
| | SRD | 75 (14.1) | 73.8 (20.3) | 74.1 (18.5) | 74 (10.4) | 79.2 (14.4) | 77.7 (13.4) |
| 41 to 60 years | N | 28 | 45 | 73 | 25 | 44 | 69 |
| | GD | 62.9 (19.4) | 62.2 (18.9) | 62.5 (19) | 69.6 (11.6) | 65.2 (18.9) | 66.8 (16.7) |
| | PHD | 64.7 (15.4) | 66.6 (14.1) | 65.9 (14.6) | 71.2 (15.8) | 65.2 (17.1) | 67.4 (16.8) |
| | ED | 69.8 (7.1) | 69 (11.8) | 69.3 (10.2) | 73.4 (4.9) | 69.7 (14) | 71 (11.6) |
| | PD | 67.1 (14.9) | 67.1 (10) | 67.1 (12) | 71 (10.9) | 66.9 (12.9) | 68.4 (12.3) |
| | SRD | 68.8 (13.2) | 73.9 (13.6) | 71.9 (13.6) | 74 (8.1) | 70.5 (11.5) | 71.8 (10.4) |
| ≥ 61 years | N | 75 | 74 | 149 | 78 | 76 | 154 |
| | GD | 70 (11.8) | 67.2 (15.4) | 68.6 (13.8) | 71.5 (9) | 70.9 (16.6) | 71.2 (13.3) |
| | PHD | 66.4 (10.2) | 65.2 (13.1) | 65.8 (11.7) | 68.8 (9.4) | 62.7 (14.9) | 65.8 (12.7) |
| | ED | 73.1 (5.6) | 71.5 (9.9) | 72.3 (8) | 73.1 (5) | 71.8 (8.9) | 72.5 (7.1) |
| | PD | 71.4 (9.1) | 68.9 (13.1) | 70.2 (11.3) | 74.5 (7.4) | 69.7 (12.2) | 72.2 (10.2) |
| | SRD | 72.3 (7.6) | 72.4 (15.7) | 72.4 (12.3) | 73.8 (5.5) | 72.6 (12.1) | 73.2 (9.2) |

$\bar{x}$ : mean; PD: standard deviation; GD = general domain; PHD = physical health domain; ED = environment domain; PD = psychological domain; SRD = social relationships domain.

Source: Authors' elaboration.

**Table 4.** WHOQOL-BREF domains by cardiovascular risk – initial assessment and reassessment.

| WHOQOL - BREF (mean) | High risk $\bar{x}$ (PD) | | Medium risk $\bar{x}$ (PD) | | Low risk $\bar{x}$ (PD) | |
|---|---|---|---|---|---|---|
| | Assessment | Reassessment | Assessment | Reassessment | Assessment | Reassessment |
| N | 88 | 95 | 26 | 21 | 137 | 131 |
| GD | 64.6 (15.5) | 67.5 (15.9) | 69.7 (12.3) | 73.2 (8.2) | 66.7 (17) | 70.6 (14) |
| PHD | 66 (13.2) | 65.3 (14.9) | 65.4 (11.7) | 66.3 (9.2) | 66.4 (13.5) | 67.6 (14.5) |
| ED | 71.4 (8) | 71.5 (7.9) | 71.8 (8.2) | 72.8 (5.5) | 71.1 (11.2) | 72.3 (10.7) |
| PD | 68.8 (12.6) | 69.8 (10.8) | 71.6 (10.1) | 74.4 (7.4) | 68 (12.9) | 70.6 (12.2) |
| SRD | 71.2 (13.2) | 72.4 (8.7) | 74 (9.5) | 72.6 (9.9) | 72.9 (14.3) | 74.2 (10.9) |

$\bar{x}$ : mean; PD: standard deviation; GD = general domain; PHD = physical health domain; ED = environment domain; PD = psychological domain; SRD = social relationships domain.

Source: Authors' elaboration.

With regard to cardiovascular risk, a significant proportion of the subjects were at high cardiovascular risk in the initial assessment (35%) (Table 5). This percentage rose to 37.8% in the reassessment, with Region 2 accounting for 60% of this group.

## Discussion

The study sample was predominantly female and 61% of participants were aged 61 years and over, obese, and reported having a good QoL. Participants with high cardiovascular risk reported the lowest QoL scores. Given the rates of morbidity and mortality resulting from cardiovascular diseases and rising obesity, the implementation of prevention and control actions is critical.

**Table 5.** Number of study participants by cardiovascular risk classification – initial assessment and reassessment.

| Cardiovascular risk | Initial assessment (n) | Reassessment (n) |
|---|---|---|
| High risk | 88 | 95 |
| Medium risk | 26 | 26 |
| Low risk | 137 | 131 |
| Death | - | 1 |
| Risk not calculated | - | 3 |
| Total | **251** | **251** |

Source: Authors' elaboration.

The results of the WHOQOL-BREF were consistent with those of other studies, with the PHD obtaining the lowest score, followed by the PD. Low scores in these domains among the older population is associated with pain and reduced mobility due to aging, the treatment of acute conditions, and mental health problems[24-27].

The predominance of women is also common in other studies, reflecting the larger proportion of women than men in older populations, a phenomenon known as feminization of aging[28]. Women are generally more concerned about health than men and more likely to seek health services due to negative self-perceptions of health and because they have more symptoms[29], while men tend to seek treatment only when symptoms appear[19,26,30].

With regard to clinical parameters, BMI was classified as overweight and obesity and did not show any improvement in the reassessment. In a recent survey of state capital cities in Brazil, 55.1% of adults in Porto Alegre showed excess weight[31], while studies conducted in companies with participants who received nutritional guidance and were encouraged to practice physical activity over a period of 12 months showed a gradual significant increase in BMI[32,33]. Another study in Minas Gerais found an association between nutritional information and regular physical activity, concluding that participants changed their eating habits and those who did regular physical activity lost weight[34]. In contrast, a randomized trial involving a weight loss intervention with or without a one-year maintenance program conducted in Finland by Pekkarinen, Kaukua and Mustajoki[35] did not find any differences in results between the group that participated in the program and the control group.

Despite the fact that the sample was made up predominantly of older persons and a significant proportion of individuals with medium and high cardiovascular risk, the mean lipid profile and blood sugar levels were satisfactory. HDL-c plays an important protective role in the prevention of cardiovascular diseases. Reducing cholesterol, particularly LDL-c, has important benefits for the outcome of cardiovascular problems. LDL-c targets therefore vary according to level of cardiovascular risk: high risk – LDL-c < 70 mg/dl; medium risk – LDL-c < 100 mg/dl; and low risk – individual target[19].

Mean BP showed a significant reduction. Cardiovascular diseases are the leading cause of death in Brazil, with risk increasing with increasing BP above 115/75 mmHg. Despite being one of the main modifiable risk factors, the prevalence of systemic hypertension is high and this problem tends to be poorly managed. Healthy eating, reducing sodium, potassium, and alcohol intake, physical exercise, and giving up smoking, combined with early detection, are the most effective ways of preventing systemic hypertension, and should be priority targets for health professionals[7,8,36,37].

The scores for the specific domains (PHD, PD, ED, SRD) observed by the present study were higher than those in similar investigations conducted with public health service users in Brazil[38,39] and similar to those reported by a study with university professors in Rio Grande do Sul[40]. It is important to highlight that Brazil is characterized by social, economic, and cultural differences[41] and that these factors influence QoL[42-44]. Our study participants live in two socially and economically distinct regions, with the regions occupying second and fifteenth place, respectively, in the state SDI ranking. However, per capita income is above the state average in both municipalities[18]. It is also worth highlighting that most of the participants had family health insurance plans, the cost of which increases with age, indicating that this group is economically advantaged. This could also explain the good QoL score, given that socioeconomic status is a determining factor for QoL[42-44].

Although the GD score showed a significant improvement in the reassessment, the same was not observed in the specific domains. This may be related to the respondents' keenness to participate in the program, as found by Baena et al.[45], who showed that keenness to participate in the program was not reflected in levels of QoL. Bandini[46] also observed that improved health parameters were not reflected in the QoL assessment. These results prompt reflection on the scope of health

Ciência & Saúde Coletiva, 26(Supl. 2):3599-3607, 2021

promotion, suggesting that joint actions across various sectors are required to improve QoL and reduce vulnerability to disease and health risks[7].

Studies assessing the structure and objectives of health promotion in the supplementary health sector have examined programs designed to promote improvements in QoL. However, these studies have tended to be isolated and focused on disease prevention and healthy lifestyles. However, studies show a willingness on the part of the private health sector to shift towards a care model focused on health promotion, inducing change and innovation[5,34,47]. Dahlgren and Whitehead[48] suggest that the success of individual health interventions depends on the understanding of the importance of the social determinants of health[49].

Our findings suggest that the supplementary health sector is contributing to the development of innovative practices in the area of health promotion. Study limitations include the use of data from electronic health records and the fact that we used a cross-sectional design, meaning that the results do not allow for follow-up of individuals over time.

The use of information on QoL for planning and developing health actions and policies remains a challenge, suggesting the need for further research in this area focusing on the supplementary sector. In this regard, it is extremely important to assess and improve the living and working environment and take into account factors such as culture. The pursuit of healthy environments requires integrated actions across various sectors, including both the public and private spheres. There is an urgent need to discuss QoL and make it a priority issue for public and private policies.

## Collaborators

HH Pohl worked on the design and in the final writing of the manuscript, CE Beschorner worked on the design, research and writing; TH Lenhard worked on methodology and statistics; NA Couto worked on the final writing; PH Santos worked on the final manuscript.

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