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Published in: Diabetes Care

DOI: 10.2337/dc07-2072

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date: 2008

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):
Prediction of Mortality in Type 2 Diabetes From Health-Related Quality of Life (ZODIAC-4)

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OBJECTIVE — To investigate the relationship between health-related quality of life (HRQOL) and mortality in type 2 diabetes.

RESEARCH DESIGN AND METHODS — In 1998, 1,143 primary care patients with type 2 diabetes participated in the Zwolle Outpatient Diabetes project Integrating Available Care (ZODIAC) study. At baseline, HRQOL was assessed with the RAND-36 and, after almost 6 years, life status was retrieved. Cox proportional hazards modeling was used to investigate the association between HRQOL (continuous data) and mortality with adjustment for selected confounders (smoking, age, sex, diabetes duration, A1C, renal function, BMI, blood pressure, HDL cholesterol, and macrovascular complications).

RESULTS — The Physical Component Summary of the RAND-36 was inversely associated with mortality (hazard ratio [HR] 0.979 [95% CI 0.966–0.992]), as were two separate RAND-36 sections (smoking, age, sex, diabetes duration, A1C, renal function, BMI, blood pressure, HDL cholesterol, and macrovascular complications).

CONCLUSIONS — This study found that HRQOL is an independent marker of mortality and emphasizes the importance of looking beyond clinical parameters in patients with type 2 diabetes.

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Received for publication 29 October 2007 and accepted in revised form 29 January 2008.

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The study population included 653 women (57%). Mean ± SD age at baseline was 68.2 ± 11.5 years with median diabetes duration 6 years (interquartile range 3–11). Median follow-up time was 5.8 years. At follow-up, 335 patients had died, 101 from cardiovascular causes. Data on HRQOL were available from 1,000 (87%) patients and complete for 857 (75%) patients. Completeness of data was inversely associated with mortality (HR 0.355 [95% CI 0.272–0.462] for one to eight missing scales; 0.549 [0.382–0.788] for all nine missing scales compared with complete data).

The PCS score was inversely associated with mortality (HR 0.979 [95% CI 0.966–0.992]). A decrease of 1 point on...
the PCS score led to an increase of the hazard of mortality of 2.1%. A total of 145 (32.4%) of 448 patients with PCS scores below the median died vs. 69 of 449 (15.4%) with PCS scores above the median (a 2.1 ratio) (Fig. 1). The MCS score was not associated with mortality (1.008 [0.994–1.022]).

For separate RAND-36 dimensions, significant relationships were found for "physical functioning" (HR 0.989 [95% CI 0.982–0.996]) and "general health perception" (0.982 [0.971–0.994]).

For cardiovascular mortality, results remained significant for physical functioning (HR 0.987 [95% CI 0.977–0.996]). HRs for general health perception and PCS were 0.967 [95% CI 0.967–1.000] and 0.982 (0.964–1.001), respectively.

CONCLUSIONS — Worse HRQOL is associated with higher overall mortality in patients with type 2 diabetes in 6 year follow-up after taking potential confounders into account. Patients with low versus high HRQOL (PCS score) have a 2.1-fold increased mortality risk. Two separate RAND-36 dimensions, physical functioning and general health perception, were related to mortality. The former has questions about ability to perform physical activities, the latter questions about patients' opinion about their health in general. Physical functioning was also associated with cardiovascular mortality.

Limitations of this study were that 25% of patients did not fill in or complete the questionnaire. However, this was strongly related to mortality and has therefore probably led to an underestimation of the effects of HRQOL on mortality (7).

Acknowledgments — This study was presented in abstract form at the 43rd Annual Meeting of the European Association for the Study of Diabetes, Amsterdam, the Netherlands, 17–21 September 2007 and published as an abstract in Diabetologia 50 (Suppl. 1):S71, 2007.

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