Quality of Life and quality of care in patients with diabetes experiencing different models of care

Margaret M. Collins, PhD¹, Tony O’Sullivan, MD², Velma Harkins, MV, MD³, Ivan Perry, PhD⁴

¹University of California Cooperative Extension, Sonora, CA
²Irishtown Health Centre, Irishtown, Dublin 4, Ireland.
³The Health Centre, Cuba Ave, Banagher, Co. Offaly, Ireland.
⁴Dept of Epidemiology & Public Health UCC

Correspondence to:  
Professor I.J. Perry  
E-mail: i.perry@ucc.ie

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Objective: To study variation in quality of life and quality of care in patients with diabetes experiencing three different models of care: traditional hospital care, hospital/General Practitioner shared care and structured GP care.

Research Design and Methods: A cross-sectional study involving 1456 patients with diabetes (71% response rate). QoL was assessed with the ADDQoL instrument and quality of care with a ten point process of care report card.

Results: The adjusted odds ratio for a high (upper quartile) ADDQoL score was significantly increased in the structured care relative to the traditional hospital care group, OR 1.7 (95% C.I. 1.2 to 2.5). A significantly higher proportion of structured GP care patients reported compliance with ≥ 7 key process of care measures compared with the other models of care.

Conclusions: Diabetes quality of life may be enhanced when care is provided in a primary care setting without compromising quality of care.
There is considerable variation in diabetes care models internationally, with care anchored in either primary care, secondary care specialist centres, or in shared care systems involving both general practice and hospital-based care. There is considerable evidence that for the majority of patients with diabetes, particularly those with type 2 diabetes, it is possible to deliver care in the primary care setting that is at least as good as that provided in specialist hospital centers. The effects of different models of care on diabetes related quality of life is less well defined.

The objective of the study was to investigate differences in quality of life and quality of care across three different models of care currently available in Ireland.

**RESEARCH DESIGN AND METHODS**

We carried out a cross-sectional questionnaire study involving 2049 people 20 to 75 years of age with a confirmed diagnosis of type 1 or 2 diabetes. Participants were recruited from three different models of care in different regions of Ireland: (i) traditional hospital care with standard referral and discharge letters between primary and secondary care, patients attending hospital-based clinics on an annual basis (N=1,245), (ii) hospital/GP shared care with local clinical guidelines, protocols and quality assurance systems, annual hospital-based review and communication across the primary-secondary interface facilitated by the community-diabetes nurse specialist (N=225), (iii) structured GP care with local clinical guidelines, protocols and quality assurance systems, practice visits by community based dieticians, chiropodists and a primary care diabetes liaison nurse, but without a local specialist diabetes unit (N=579). The self completed questionnaire addressed standard demographic, social and clinical factors including age, gender, marital, employment, educational and health insurance status, type of diabetes, treatment and complications. Quality of life was assessed with the Audit of Diabetes Dependent Quality of Life (ADDQoL) instrument and general health status using the SF-36 questionnaire instrument. Quality of care was assessed with a patient completed report card based on ten process of care measures carried out in the last year for diabetes: ≥ 3 GP visits for diabetes, HbA1c measurement, BP measurement, urine tested for protein, prescribing of aspirin and cholesterol lowering medication, foot and dilated eye examination, consultation with dietician, and smoking assessment.

Standard Chi-square and nonparametric methods were used to compare the distribution of relevant categorical variables and median ADDQoL scores in sub groups of patients with diabetes. The prevalence odds ratio (OR) for an ADDQoL score in the upper quartile of the distribution was estimated for the shared care and structured care models relative to the traditional mixed care model using binary logistic regression with adjustment for relevant confounders.

The study was approved by the Research Ethics Committee of the Cork Teaching Hospitals.

**RESULTS**

The response rate was 71% (N=1456). The age and gender distribution was similar across the three models of care. However in the traditional hospital care group a higher proportion of participants had type 1 diabetes, were on insulin and had documented diabetes complications. Quality of care was higher in the structured GP care group than in the traditional hospital or hospital / GP shared care groups for all process of care measures, with the exception of Ophthalmic review and
smoking assessment. The structured GP care model had a higher proportion of patients who completed ≥ 7 process of care measures (55%) score relative to the traditional hospital care group (35%) and hospital/GP shared care model (37%) respectively.

Diabetes exerts a significant negative impact on quality of life with median ADDQoL scores of -1.73 and -1.67 in men and women respectively. The most negatively impacted domains in the ADDQoL instrument were freedom to eat, enjoyment of food, freedom to drink and worries of the future. Diabetes related QoL was marginally better in older patients, those of higher educational status and in employed relative to unemployed patients. Diabetes QoL was significantly lower in divorced and separated patients, those without private health insurance, patients with type 1 diabetes, type 2 patients on insulin and in patients with one or more diabetes complications. Patients in the structured GP care model had significantly higher ADDQoL scores, median -1.22 relative to patients in the hospital/GP shared care and traditional mixed care groups with median scores of -1.77 and -1.88 respectively.

In multivariate analyses, structured GP care and higher physical and mental functioning were associated with significantly higher ADDQoL score while type 1 diabetes was associated with a lower diabetes related QoL score, (Table 1).

CONCLUSIONS

The findings highlight the impact of diabetes on quality of life with particular reference to the effects on freedom to eat, enjoyment of food, freedom to drink and worries about the future. Relative to the overall negative effects of diabetes on quality of life, the effect of specific socio-demographical and clinical factors was fairly modest. This is consistent with earlier work 9-10.

Patients in the structured GP care model were almost twice as likely to have higher quality of life scores as patients in the traditional mixed care model in analyses adjusted for age, sex, diabetes complications, and other potential confounders. Patients in the structured care group also reported significantly higher compliance rates for seven out ten process of care measures than those in the other models of care.

The cross-sectional, non-experimental design is an important limitation of this study as is the lack of objective outcome data such as glycosylated hemoglobin. Patients in the traditional mixed care group were more likely to have type I diabetes and diabetes complications. While we adjusted for these factors, there may be additional markers of morbidity unaccounted for in our analyses. In the context of this cross-sectional study it should also be noted that a patient may well need to be seen in all three models at different stages of the disease, not just in primary care.

In summary we have highlighted important determinants of quality of life in patients with diabetes and provided evidence to suggest that diabetes quality of life may be enhanced when care is provided by general practitioners in a primary care setting.

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**Table 1.** Determinants of the ADDQoL Score in Patients with Types 1 & 2 Diabetes

| Determinants of ADDQoL Score | OR*     | CI (95%)   | P value | OR**    | CI (95%) | P value |
|------------------------------|---------|------------|---------|---------|----------|---------|
| **Sex** female vs. male      | 0.97    | 0.76-1.25 | 0.81    | 1.35    | 0.92-1.97| 0.12    |
| **Age** 40-59 yrs vs. 20-39 yrs | 1.23    | 0.73-2.06 | <0.01  | 1.29    | 0.57-2.91| 0.72    |
| 60+ yrs vs. 20-39 yrs        | 1.85    | 1.12-3.05 | <0.001 | 2.07    | 0.87-4.93| 0.72    |
| **Type** 2 vs. type 1         | 1.49    | 1.03-2.16 | 0.04    | 2.2     | 1.04-4.66| 0.04    |
| **Insulin** vs. non-insulin use | 0.53    | 0.39-0.72 | <0.001 | 0.92    | 0.52-1.64| 0.78    |
| **Health services coverage** |         |            |         |         |          |         |
| medical card + private insurance vs. medical card | 1.26 | 0.84-1.90 | 1.19    | 0.69    | 2.04    | 0.83    |
| private insurance vs. medical card | 1.76 | 1.25-2.47 | <0.01  | 1.04    | 0.64    | 1.70    | 0.83    |
| **Education** secondary higher cycle vs. p/s lower cycle | 1.31 | 0.93-1.84 | 1.32    | 0.82    | 2.12    | 0.10    |
| third level vs. p/s lower cycle | 1.56 | 1.03-2.36 | 1.98    | 1.11    | 3.50    | 0.84    |
| postgraduate vs. p/s lower cycle | 1.18 | 0.56-2.48 | 0.12    | 1.73    | 0.67    | 4.47    | 0.10    |
| **Employed** vs. unemployed | 1.45    | 1.08-1.96 | 0.01    | 1.05    | 0.66    | 1.67    | 0.84    |
| **Married** vs. unmarried     | 0.95    | 0.73-1.23 | 0.69    | 0.91    | 0.62    | 1.34    | 0.64    |
| **Models of care** hospital/GP shared care vs. traditional mixed | 1.33 | 0.87-2.04 | 1.45    | 0.74    | 2.80    | 0.10    |
| structured GP care vs. traditional mixed | 1.6 | 1.22-2.09 | <0.01  | 1.71    | 1.16    | 2.54    | 0.02    |
| **Diabetes complications** one vs. none | 0.59 | 0.42-0.82 | 0.90    | 0.55    | 1.46    | 0.10    |
| two or more vs. none         | 0.37    | 0.28-0.50 | <0.001 | 0.69    | 0.44    | 1.08    | 0.23    |
| **SF-36 PCS Physical function upper quartile vs. quartiles 1-3** | 3.74 | 2.75-5.10 | <0.001 | 3.09    | 2.46    | 5.55    | <0.001 |
| **SF-36 MCS Mental function upper quartile vs. quartiles 1-3** | 3.24 | 2.39-4.40 | <0.001 | 2.20    | 2.08    | 4.59    | <0.001 |

*Logistic regression model for each variable, adjusted for age and sex only.
**Logistic regression model adjusted for age and sex and all other variables in the table.