

The Relationship Between Compliance and Quality of Life among Adolescents with Diabetes Mellitus Type 1: Exploring the Impact of an Information-Giving Intervention

Mary Ngandu, Anitha Menon

Department of Psychology, University of Zambia

DOI: <https://doi.org/10.47772/IJRISS.2026.1026EDU0568>

Received: 29 August 2026; Accepted: 03 September 2026; Published: 17 September 2026

ABSTRACT

Objectives: This study investigated the relationship between compliance and quality of life among adolescents with diabetes mellitus type 1 (DMT1), and specifically examined the impact of an information-giving intervention on compliance and quality of life, together with the factors related to compliance and its effect on quality of life.

Methodology: A controlled trial with an intervention group and a wait-list control group was used; participants were allocated to groups using a systematic, non-random procedure based on alphabetical list position rather than true randomisation (see Methods). Data were collected from 40 adolescents aged 16 to 19 years attending the Diabetes Association of Zambia (DAZ) Centre at the University Teaching Hospital (UTH), Lusaka.

Measures: A social-demographic questionnaire, the Rating Scale for Compliance (RSC) and the Diabetes Quality of Life Scale modified for youths (DQOL) were administered at baseline and at eight-week follow-up.

Main outcomes: Compliance to treatment, impact of diabetes and worries about diabetes were significantly better in the intervention group at follow-up, and compliance and quality of life were positively correlated. Because groups were not randomly allocated and differed significantly on compliance at baseline, these findings are consistent with, but cannot on their own establish, a positive effect of the information-giving intervention on adolescents' behaviour toward their prescribed treatment regimen.

Conclusion: Participation in the information-giving intervention was associated with improvements in compliance and most dimensions of quality of life among adolescents with DMT1. Given the non-random allocation, baseline imbalance in compliance, and small single-site sample, these findings should be treated as preliminary evidence for, rather than confirmation of, the value of structured psychoeducational interventions in diabetes care.

Keywords: Adolescents, diabetes, compliance, quality of life, information-giving intervention

INTRODUCTION

Diabetes mellitus is a chronic condition affecting approximately 285 million people worldwide, a figure projected to rise by more than 50% over the next twenty years (Novato and Gross, 2009). It is now among the most common non-communicable diseases globally and ranks as the fourth or fifth leading cause of death in most high-income countries, with growing evidence that it is reaching epidemic proportions in developing and newly industrialised nations (IDF, 2009). Complications arising from diabetes — including coronary artery disease, peripheral vascular disease, stroke, neuropathy, amputation, renal failure and blindness — contribute to increasing disability, reduced life expectancy and substantial health costs (IDF, 2009).

Diabetes occurs when the body cannot produce or effectively use insulin, the hormone manufactured in the pancreas that regulates blood glucose levels (IDF, 2009). Type 1 diabetes mellitus (DMT1) results from autoimmune-mediated destruction of pancreatic beta cells, precipitated by environmental factors acting on a genetically susceptible individual, and leads to absolute insulin deficiency (Daneman, 2006). Without adequate insulin, glucose cannot move from the extracellular fluid into cells; the resulting energy deficit drives the breakdown of fat and muscle tissue and the accumulation of glucose in the blood, producing hyperglycaemia (Court et al., 2009).

There are few detailed studies on diabetes in Zambia. Existing estimates place prevalence at approximately 12.0 per hundred population, compared with the International Diabetes Federation's estimate of DMT1 prevalence of 4.8 per hundred thousand (Baren et al., 2005). The International Diabetes Federation further estimates the prevalence of diabetes in Zambia at 3.1%, with diabetic retinopathy accounting for 4.8% of all blindness (Kaseba, 2012). The relatively higher priority given to diabetes care in national health planning has been attributed, in part, to the advocacy and educational role played by the Diabetes Association of Zambia (DAZ).

Diabetes and Adolescents

Diabetes affects an adolescent's emotions both directly and indirectly. Poorly controlled blood sugar can directly influence mood and behaviour, including irritability, and adolescents with diabetes face an increased risk of depression and anxiety, one reason many diabetes care teams include a social worker or psychologist (Battista et al., 2009). As adolescents move toward independence, a disease that makes them feel powerless may lead them to assert control by skipping medication, missing appointments, or ignoring dietary restrictions (Health Information, 2012). Overprotective parenting styles can further delay a teenager's readiness to take responsibility for their own treatment, so that low compliance becomes a way of resisting parental and professional authority (Taddeo, 2008).

Adolescents with diabetes also tend to underestimate their vulnerability to the disease's long-term consequences, consistent with a general adolescent preoccupation with the present (Guthrie, 2003). Experimentation with drugs or alcohol, eating disorders, and missed insulin doses are correspondingly more common in the adolescent years (Health Information, 2012). Treatment compliance among adolescents with DMT1 is estimated to be as low as 50%, making it both a social and a medical problem (Frank, 2005).

Psychological Factors and Treatment Compliance

Metabolic control tends to deteriorate in adolescents relative to children and adults, a pattern attributable to the physiological changes of puberty as well as compliance difficulties that intensify during this period (Frank, 2005). Poor treatment compliance is best understood within the context of normal adolescent development, where experimentation, rebellion and risk-taking accompany the adolescent's struggle for control over their own life circumstances, a dynamic that is challenging for adolescents, parents and health professionals alike (Frank, 2005).

Compliance is widely regarded as the single most important determinant of a healthy outcome for the diabetic patient (Cadena, 2007). Beyond metabolic control, compliance helps patients maintain a sense of control over their situation and supports both emotional and physical wellbeing, whereas noncompliance can precipitate life-threatening complications (Novato and Gross, 2009). Structured information-giving has been identified in the literature as a means of reducing the stress and maladaptive coping including anxiety, depression and disordered eating — that often accompany poor diabetes management in adolescents (Delamater, 2006). This study was designed to test that proposition directly by evaluating a structured information-giving intervention against a wait-list control among Zambian adolescents with DMT1.

Objectives of the Study

The primary objective of this study was to explore the impact of an information-giving intervention on compliance and quality of life among adolescents with diabetes mellitus type 1. Specific objectives were to:

(i) determine whether an eight-week structured information-giving intervention improved treatment compliance relative to a wait-list control group; (ii) determine the intervention's impact on quality-of-life domains, namely impact of diabetes, worries about diabetes, and satisfaction with life; (iii) identify the behavioural factors associated with compliance, insulin timing, insulin-dose changes, meal timing, dietary lapses, physical exercise and hypoglycaemic episodes; and (iv) test the hypothesis that compliance is positively correlated with quality of life among adolescents with DMT1.

METHODS

Study Design

This study used a quasi-experimental, two-group controlled trial design with a wait-list control group, incorporating a cross-sectional baseline assessment. Group allocation followed a systematic, non-random procedure (described below) rather than true randomisation, so the design does not meet the criteria for a randomised controlled trial. Data were collected from participants aged 16 to 19 years at two time points: baseline (week 1) and follow-up (week 10).

Study Setting

The study was conducted at the Diabetes Association of Zambia (DAZ) Centre, University Teaching Hospital (UTH), Lusaka. DAZ was selected because it provides counselling, blood-sugar testing, treatment facilities and ongoing support to people living with diabetes, and had approximately 250 registered adolescent members at the time of the study.

Study Sample and Recruitment

A total of 40 adolescents with DMT1, diagnosed within the preceding six months, were recruited from DAZ records. A list of eligible adolescents aged 16–19 was drawn up in alphabetical order and stratified by gender and by age band (16–17 and 18–19 years). Within each stratum, adolescents whose names carried even list-numbers were assigned to the intervention group and those with odd list-numbers to the control group, yielding 20 participants per group. This is a systematic (quasi-random) allocation rule rather than a genuinely random one: because a participant's position on the alphabetically ordered list determined their group with certainty, the sequence of assignment was predictable in advance and was not generated by a chance mechanism (e.g., a random-number generator or computer-generated sequence) or concealed from those enrolling participants. The procedure cannot therefore be assumed to distribute unmeasured characteristics evenly between groups, and the significant baseline imbalance in compliance reported below is consistent with this. The study is accordingly best described as a quasi-experimental, non-randomised controlled trial, and causal claims about the intervention's effects should be interpreted with this in mind. All 40 adolescents completed baseline assessment; the intervention group then received the eight-week programme, after which both groups completed the follow-up assessment. Inclusion criteria were: age 16–19 years; literacy in English; DAZ membership; and a diagnosis of DMT1. Adolescents who were acutely unwell at the time of the study, or who did not consent, were excluded.

Intervention Procedure

At baseline (week 1), all 40 adolescents completed the demographic questionnaire, the Diabetes Quality of Life Scale for youths, and the Rating Scale for Compliance. From week 2 to week 9, the intervention group met with the researcher once weekly for one hour, over eight sessions. Each session reviewed group rules, delivered structured information on diabetes, compliance and quality of life, and included a discussion of participant-initiated issues together with non-competitive group activities and refreshment time, supported by DAZ staff. The intervention therefore combined several components delivered together: structured informational content; weekly peer contact and group discussion; non-competitive group activities; and attention and support from the researcher and DAZ staff. This design does not permit the contribution of the informational content to be separated from that of peer interaction, group support, staff attention, or the transport allowances and refreshments provided at each visit; any of these non-informational components

could plausibly account for part of the outcomes attributed here to "information-giving". Information was delivered using the school information booklet "You, Me and Diabetes" (De Jong and Bennink, 2006), covering the importance of diet, exercise and adherence to prescribed treatment; participants also received a take-home dietary leaflet to discuss with parents or caregivers, and diabetes-clinic staff were on hand to answer questions on diet, exercise and treatment. At week 10 (follow-up), both the intervention and control groups completed the same battery of measures used at baseline. After the study concluded, the same information was subsequently offered to the control group, in keeping with the wait-list design.

Measures

Three instruments were administered at both time points. The social-demographic questionnaire, designed by the researchers, captured personal and background information for each participant. The Rating Scale for Compliance (RSC), authored by Clarke and Goosen (2005), assessed four behavioural and lifestyle components of compliance: time at which insulin was taken, changes to insulin dose, delay in meal timings, lapses in diet, frequency of physical exercise, and hypoglycaemic episodes; lower scores indicate higher compliance. The Diabetes Quality of Life Scale modified for youths (DQOL), authored by Jacobson et al. (1988), comprises 39 items across three subscales — impact of diabetes, worries about diabetes, and satisfaction with life — and was designed specifically for adolescent and young-adult populations with insulin-dependent diabetes; lower scores indicate a more favourable outcome on the impact and worry subscales, and lower scores indicate greater satisfaction with life. Because all three DQOL subscales and the RSC are scored so that lower values represent more favourable status, the total scores derived from them for the correlation analysis reported below are similarly oriented, with lower totals indicating better compliance or better overall quality of life. Published reliability and validity evidence for both instruments comes from their original validation samples (Clarke & Goosen, 2005, for the RSC; Jacobson et al., 1988, for the DQOL); internal-consistency reliability (e.g., Cronbach's alpha) was not recalculated for the present Zambian adolescent sample, and this should be reported in future applications of these measures in this population.

Data Analysis

Descriptive statistics were used to summarise demographic characteristics and to profile responses to individual compliance items. The Mann-Whitney U test was used to compare the intervention and control groups on compliance, impact of diabetes, worries about diabetes, and satisfaction with life at baseline and at follow-up, and Statistical Package for Social Sciences (SPSS) version 16.0 for Windows was used for all analyses. For each Mann-Whitney comparison, an effect size r was calculated as $r = Z/\sqrt{N}$ ($N = 40$) and is reported alongside the Z and p values, following conventional benchmarks of approximately 0.10, 0.30 and 0.50 for small, medium and large effects respectively. Exact confidence intervals for these rank-based effects could not be reconstructed because the archived SPSS output retained only group means, Z statistics and p values rather than the underlying ranks or standard errors; we recommend that any future reanalysis of the original raw data report bootstrap confidence intervals for these effects. Because the intervention and control groups differed significantly on compliance at baseline (see Results), comparing the groups on follow-up scores alone, as in the original analysis, cannot separate the effect of the intervention from the effect of the baseline imbalance itself (for example, regression toward the mean among adolescents who started with poorer compliance). Ideally, this would be addressed with an analysis of covariance (ANCOVA) or a comparable regression model using baseline score as a covariate; this could not be performed here because individual-level raw data were not retained for reanalysis, and only group summary statistics were available. As a partial, descriptive check, we therefore also report each group's mean change (follow-up minus baseline) alongside the between-group comparisons, while noting that this cannot substitute for a properly covariate-adjusted inferential test and that baseline imbalance remains a limitation of the original design. A bivariate (Pearson) correlation coefficient was computed at follow-up to test the hypothesis that compliance and quality of life are positively correlated, at a significance level of 0.01. Both the compliance total and the quality-of-life total are scored so that lower values represent more favourable status (see Measures); a positive correlation between the two raw totals therefore indicates that better compliance (lower score) tends to co-occur with better quality of life (lower score), and this is the interpretation adopted throughout.

Ethical Considerations

Permission to conduct the study was obtained from the DAZ Centre and from UTH, and ethical approval was obtained from the Research Ethics Committee, University of Zambia. Participants' rights to self-determination, privacy, anonymity, confidentiality, fair treatment and protection from harm were respected throughout, and informed consent/ascent was obtained from each participant accordingly. Adolescents received transport allowances and refreshments for each intervention visit, in recognition of the distances travelled to attend sessions.

RESULTS

The sample comprised 22 (55.0%) male and 18 (45.0%) female adolescents, evenly distributed across the control and intervention groups: 11 (27.5%) males and 9 (22.5%) females in each group. By age, both the control and intervention groups included 7 (17.5%) adolescents aged 16–17 years and 13 (32.5%) aged 18–19 years, indicating that the two groups were well balanced on gender and age, although, as reported below, they were not balanced on baseline compliance.

Compliance to Treatment

At the item level, the intervention group at follow-up showed markedly improved compliance across all measured behaviours. All adolescents (100%) in the intervention group took insulin on time on all days, made no unauthorised changes to their insulin dose, and took meals on time. Seventy-five percent reported no lapses in diet, all (100%) engaged in physical exercise at least five times a week, and all (100%) reported no hypoglycaemic episodes at follow-up, a pattern consistent with a positive effect of the information-giving intervention on treatment-related behaviour.

A Mann-Whitney U test compared the control and intervention groups on total compliance score at baseline and follow-up. Lower scores indicate higher compliance. Effect size r is reported alongside Z and p (see Data analysis).

Time	Control mean (n=20)	Intervention mean (n=20)	Z	p	Effect size r
Baseline	14.60	26.40	-3.416	.001	0.540
Follow-up	30.00	11.00	-5.570	.000	0.881

At baseline, the intervention group already showed a significantly higher (poorer) mean compliance score than the control group ($Z = -3.416$, $p = .001$, $r = .54$, a large effect). By follow-up this pattern had reversed decisively: the intervention group's mean compliance score fell to 11.00 against 30.00 in the control group ($Z = -5.570$, $p = .000$, $r = .88$, a very large effect). Because the groups already differed significantly at baseline, the follow-up comparison alone cannot isolate the intervention's contribution from the effect of this initial imbalance. As a descriptive check, the control group's mean compliance score worsened by 15.40 points from baseline to follow-up (14.60 to 30.00), while the intervention group's mean compliance score improved by 15.40 points over the same period (26.40 to 11.00) changes of similar magnitude but opposite direction. This pattern of change is consistent with, though it does not on its own confirm, a genuine intervention effect, since it could also partly reflect regression toward the mean in a group that began with poorer compliance; without individual-level data to fit a baseline-adjusted model (e.g., ANCOVA), the relative contribution of the intervention versus the baseline imbalance cannot be fully disentangled. This pattern of change, taken together with the large follow-up effect size, is broadly consistent with a positive effect of the information-giving intervention on compliance, though the baseline imbalance means this conclusion should be treated as provisional rather than confirmed.

Impact of Diabetes

Lower scores indicate a lower (more favourable) impact of diabetes on daily functioning.

Time	Control mean (n=20)	Intervention mean (n=20)	Z	p	Effect size r
Baseline	17.8	23.2	-1.47	.14	0.232
Follow-up	24.2	16.8	-2.00	.045	0.316

There was no significant difference between groups at baseline ($Z = -1.47$, $p = .14$, $r = .23$, a small-to-medium effect). At follow-up, the intervention group reported significantly less impact of diabetes on daily life than the control group ($Z = -2.00$, $p = .045$, $r = .32$, a medium effect), a pattern consistent with, though not sufficient on its own to confirm, a positive effect of the information given during the intervention on adolescents' ability to adjust to and manage the demands of the illness.

Worries About Diabetes

Lower scores indicate fewer worries about diabetes.

Time	Control mean (n=20)	Intervention mean (n=20)	Z	p	Effect size r
Baseline	22.35	18.65	-1.019	.309	0.161
Follow-up	26.68	14.32	-3.353	.001	0.530

No significant baseline difference was observed between groups ($Z = -1.019$, $p = .309$, $r = .16$, a small effect). At follow-up, the intervention group reported significantly fewer worries about diabetes than the control group ($Z = -3.353$, $p = .001$, $r = .53$, a large effect), consistent with a reassuring, normalising effect of the intervention sessions; because the sessions combined structured information with peer interaction, group discussion and staff support, this finding cannot be attributed to the informational content alone.

Satisfaction With Life

Lower scores indicate greater satisfaction with life.

Time	Control mean (n=20)	Intervention mean (n=20)	Z	p	Effect size r
Baseline	22.42	18.58	-1.057	.290	0.167
Follow-up	12.50	28.50	-4.394	.000	0.695

There was no significant baseline difference between groups ($Z = -1.057$, $p = .290$, $r = .17$, a small effect). At follow-up, however, the control group reported significantly greater satisfaction with life than the intervention group ($Z = -4.394$, $p = .000$, $r = .69$, a large effect) — the one outcome on which the intervention group did not show a relative improvement.

Relationship Between Compliance and Quality of Life

A bivariate (Pearson) correlation was computed between total compliance and total quality-of-life scores at follow-up to test the hypothesis of a positive relationship between the two variables.

	Total Quality of Life	Total Compliance
Total Quality of Life — Pearson r (Sig., N)	1 (—, 40)	.468 (.002, 40)
Total Compliance — Pearson r (Sig., N)	.468 (.002, 40)	1 (—, 40)

The correlation between total compliance and total quality of life was $r = .468$, $p = .002$, significant at the 0.01 level. The alternative hypothesis was therefore accepted: higher compliance levels were associated with better quality of life among adolescents with DMT1 at follow-up.

DISCUSSION

Compliance to Treatment

The intervention group showed markedly greater compliance to diabetes treatment than the control group at follow-up, a large effect that is consistent with a positive impact of the information-giving intervention. However, because groups were not randomly allocated and already differed significantly on compliance at baseline, this result cannot be fully separated from the effect of the baseline imbalance itself, and should be interpreted as suggestive rather than conclusive evidence of a treatment effect (see Methods and Results). With that caveat, the pattern is consistent with the information adolescents received over the eight-week programme having contributed to positive behaviour change with respect to insulin administration, meal timing, diet, exercise and avoidance of hypoglycaemic episodes, although the intervention's group-support, peer-contact and staff-attention components could also have contributed and cannot be distinguished from the informational content in this design. This is broadly consistent with literature indicating that knowledge alone is not always sufficient to sustain high compliance, since behavioural factors such as family stress, poor coping and inappropriate levels of child responsibility can also predict lower compliance (Patton, 2006); nonetheless, structured knowledge-giving has been shown to reduce the anxiety, depression and maladaptive coping associated with compliance problems (Delamater, 2006). High compliance in this study appeared to be underpinned by improved motivation, a stronger sense of normality, and support from parents, physicians and nurses, together with a more positive attitude toward the illness and its treatment (Kyngäs, 2000).

Impact of Diabetes and Worries About Diabetes

The intervention group experienced significantly less impact of diabetes and fewer worries about diabetes at follow-up, a pattern consistent with adolescents being better able to adjust to and live positively with the illness after taking part in the intervention. Group interaction during the intervention period may have played a supportive role: participants shared experiences of coping with diabetes and with family and social relationships, and were able to support one another; because the sessions combined structured information with this peer interaction and group support, the present design cannot establish which component, or combination of components, drove the observed improvement.

This finding stands in partial contrast to literature suggesting that adolescents may struggle to incorporate a medical condition into their evolving sense of self, with resulting worry, stress and even denial of the illness (Frank, 2005); the present results are consistent with the possibility that a structured, peer-based intervention can help counter this tendency and support better treatment adherence (Taddeo, 2008), though this would need to be confirmed in a design able to isolate the intervention's active ingredients.

Satisfaction With Life

Contrary to the pattern for compliance, impact and worries, the control group reported greater satisfaction with life than the intervention group at follow-up. This unexpected finding may reflect behavioural factors known to predict lower life satisfaction among adolescents managing a chronic illness, including family stress, and the burden of increased responsibility for self-management that intervention participants may have felt as they took on board new information about their condition (Taddeo, 2008). It is also possible that greater awareness of the illness and its demands while beneficial for compliance temporarily reduced the intervention group's sense of normalcy relative to peers, since adolescents may find it harder to disclose a chronic condition to friends or partners (Kent et al., 2010). Other literature suggests that time spent with family and peers can support positive self-management behaviour that, over a longer period, promotes greater life satisfaction (Grayson, 2002), raising the possibility that satisfaction with life may respond to information-giving interventions on a longer time horizon than the eight weeks used in this study.

Relationship Between Compliance and Quality of Life

The significant positive correlation between compliance and quality of life ($r = .468$, $p = .002$) supports the study's central hypothesis. Because both totals are scored so that lower values are more favourable (see Measures), this positive correlation means that adolescents with better compliance (lower scores) tended also to report better overall quality of life (lower scores), consistent with literature indicating that compliance is the foremost determinant of healthy outcomes in diabetic patients, helping them maintain control over their emotional and physical wellbeing, whereas noncompliance is associated with life-threatening complications (Novato and Gross, 2009; Cadena, 2007). As a cross-sectional association at a single follow-up point, this correlation establishes that compliance and quality of life move together but cannot establish that one causes the other. Together with the between-group findings, these results are consistent with structured, multicomponent, information-giving interventions being able to improve treatment compliance and several dimensions of quality of life among adolescents with DMT1, while also highlighting satisfaction with life as an area that may need to be addressed through complementary, family-inclusive strategies; confirming this would require a study with concealed random allocation, baseline-adjusted analysis, and a design able to separate the intervention's informational and social components.

CONCLUSION

This study found a positive correlation between compliance and quality of life among adolescents with diabetes mellitus type 1. Compliance to treatment, impact of diabetes and worries about diabetes were all significantly better in the intervention group than the control group at follow-up, with medium-to-large effect sizes; taken together with the intervention group's improvement from a poorer baseline, this pattern is consistent with, though not conclusive proof of, a positive effect of participation in the eight-week intervention on adolescents' behaviour toward their prescribed treatment regimen.

Because groups were not randomly allocated and the intervention combined structured information with peer support and group interaction, these findings should be treated as preliminary rather than definitive evidence of a causal effect, and they do not by themselves distinguish the contribution of the informational content from that of the intervention's social components. Satisfaction with life, however, was lower in the intervention group at follow-up than in the control group, indicating that this dimension of quality of life may require additional or longer-term support beyond the eight-week intervention alone. The hypothesis of a positive correlation between compliance and quality of life was supported ($r = .468$, $p = .002$, significant at the 0.01 level), consistent with the view that compliance is an important correlate of wellbeing in diabetic adolescents, though the cross-sectional nature of this correlation means it cannot establish that compliance causes better quality of life.

LIMITATIONS

Several methodological limitations should be considered when interpreting these findings. First, allocation to groups followed a systematic rule based on alphabetical list position rather than a concealed, chance-

based randomisation procedure; because this sequence was predictable in advance, unmeasured characteristics correlated with list position cannot be ruled out as a source of confounding, and the study is more accurately described as quasi-experimental than as a true randomised controlled trial. Consistent with this, the groups differed significantly on compliance at baseline. Second, because raw, individual-level data were not retained for reanalysis, the follow-up comparisons could not be adjusted for baseline scores using analysis of covariance or an equivalent regression model; the Mann-Whitney comparisons and the supplementary descriptive change-score comparisons reported here are therefore unable to fully separate the intervention's effect from the effect of this baseline imbalance (including possible regression toward the mean).

Third, the intervention itself combined several components structured information, weekly peer contact and group discussion, non-competitive group activities, and attention and material support (transport allowances and refreshments) from the researcher and DAZ staff — delivered together, so the specific contribution of information-giving as such cannot be distinguished from these other components with the present design. Fourth, data were derived exclusively from self-report measures, which may introduce response bias related to social desirability or defensiveness.

Fifth, the sample was drawn from adolescents recently diagnosed with DMT1, a group already at heightened risk of poor compliance, so factors such as limited parental support may have influenced findings independently of the intervention, even though compliance improved following the intervention at follow-up. Sixth, the relatively small sample size ($n = 40$) and the single study site limit the generalisability of these findings to the wider population of Zambian adolescents with DMT1, and limit the precision with which effect sizes could be estimated; exact confidence intervals for the reported effects could not be reconstructed from the archived summary statistics. Finally, internal-consistency reliability of the RSC and DQOL was not recalculated for this sample, so their psychometric performance in this specific population remains unverified.

RECOMMENDATIONS

Structured information-giving interventions of the kind used in this study appear promising and should be evaluated further before wider implementation at diabetes clinics and associations across Zambia, delivered where possible by multidisciplinary teams including psychologists or social workers. Future research should address the methodological limitations identified above: allocation should use a genuinely random, concealed procedure (for example, a computer-generated random sequence combined with sequentially numbered, sealed opaque envelopes) rather than a predictable systematic rule; analyses should adjust for baseline scores (for example, using ANCOVA or a mixed-effects model) rather than comparing follow-up scores alone, particularly where baseline imbalance is present; effect sizes and confidence intervals should be reported routinely alongside p-values, ideally computed from the retained raw dataset; internal-consistency reliability (e.g., Cronbach's alpha) of the RSC and DQOL should be reported for the specific sample used; and a dismantling or component-comparison design should be considered so that the contribution of structured information can be separated from peer interaction, group support and other non-informational components of the intervention. Future research should also explore longer follow-up periods and family-inclusive components to establish whether satisfaction with life responds positively to information-giving over a longer time horizon, and should consider larger, multi-site samples to improve generalisability and statistical power.

ACKNOWLEDGEMENTS

The authors wish to thank the Department of Psychology, University of Zambia, for its support throughout this research, and the University Teaching Hospital and Diabetes Association of Zambia staff for their assistance during data collection. We are grateful to the adolescents and their families who participated in this study.

REFERENCES

1. Baren, D., Yudkin, J.S., & Courten, M. (2005). Access to care for patients with insulin-requiring diabetes in developing countries: case studies of Mozambique and Zambia. *Diabetes Care*, 28(9), 2136–2140.
2. Battista, A., Hart, T.A., & Greco, L. (2009). Type 1 diabetes among adolescents. *Sage Journals*, 35(3), 465–471.
3. Cadena, C. (2007). Medication compliance important to diabetes. Retrieved from voices.yahoo.com.
4. Clarke, D., & Goosen, T. (2005). Depression and compliance with treatment in a sample of Northland diabetes patients. *New Zealand Medical Journal*, 118(1222).
5. Court, J.M., Cameron, F.J., Berg-Kelly, K., & Swift, G.F.P. (2009). Diabetes in adolescence. *Pediatric Diabetes*, 10(12), 185–194.
6. Daneman, D. (2006). Type 1 diabetes. *Lancet*, 367, 847–858.
7. De Jong, R., & Bennink, C. (2006). *You, Me and Diabetes: Kids and Care*. Johannesburg, South Africa.
8. Delamater, A.M. (2006). Improving patient adherence. *Clinical Diabetes*, 24(2), 71–77.
9. Frank, M.R. (2005). Psychological issues in the care of children and adolescents with type 1 diabetes. *Paediatric Child Health*, 10(1), 18–20.
10. Grayson, N.H. (2002). A developmental perspective on adolescent health and illness. *Journal of Pediatric Psychology*, 27(5), 409–416.
11. Guthrie, W.D., Bartsocas, C., Chabot, J.P., & Konstantinova, M. (2003). Psychosocial issues for children and adolescents with diabetes: overview and recommendations. *Diabetes Spectrum*, 16, 7–12.
12. Health Information (2012). Type 1 diabetes in children. Foundation for Medical Education and Research.
13. International Diabetes Federation (2009). *Diabetes Atlas*, Fourth Edition.
14. Jacobson, A.M., Barofsky, I., Cleary, P., & Rand, L. (1988). Diabetes Quality of Life Measure for youths.
15. Kaseba, C. (2012). Diabetic eye care programme launched in Kitwe. *Extreme Zambia*.
16. Kent, D., Haas, L., Randall, D., Lin, E., et al. (2010). Healthy coping: issues and implications in diabetes education and care.
17. Kyngäs, H.A. (2000). Predictors of good adherence of adolescents with diabetes (insulin-dependent diabetes mellitus). *Sage Journals*, 3(1), 20.
18. Novato, T., & Gross, S.A.A. (2009). Factors associated with the quality of life of adolescents with type 1 diabetes mellitus. *Rev Esc Enferm USP*, 45(3), 766–772.
19. Patton, S. (2006). Adherence to treatment in children and adolescents with type 1 diabetes mellitus. *US Paediatric Review*.
20. Taddeo, D., Egedy, M., & Frappier, J. (2008). Adherence to treatment in adolescents. *Paediatric Child Health*, 13(1), 19–24.