Quality of Life in Children with Type 1 Diabetic – A Systematic Review

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Abstract

Background : Quality of life (QOL) is commonly used in the health care industry to assess the general well-being of the individual. Assessing QOL among children with diabetes, is completed with a disease specific approach.[1] The main aim of the present study was to systematically review the characteristics of published studies in children with type 1 diabetic Quality of life and examine the quality of their findings.

Method and Material: The 141 research articles searched in (PubMed, Web of Science, CINAHL, Scopus, Academia ,open access) databases using the following search terms: "type 1 diabetic" and "quality of life" . Depending on the inclusion and exclusion criteria studies were filtered and 12 studies were chosen for the final analysis. This systematic review was designed and conducted with the Published Guidelines for Reporting Systematic Reviews and Meta-Analyses (PRISMA)

Result : The studies showed that sampling size differs in each study from 20 till 3005 it selected . but in many studies sample size is below 100. Validity and reliability were not done in many studies. For reliability al studies who mentioned about validity used Cronbach's α coefficient to check the tool efficiency. Studies showed that people with diabetes had lower QoL . however the Quality of Life is directly related to the disease condition, HbA1 c and glycaemic control of children . Better control of Diabetic Mellitus is associated with better health related QoL.

Key words : *quality of life, children, type 1 diabetic* .

Introduction

Diabetes is demanding disease. Sometimes children with type 1 diabetes will manage their diabetes effectively and manage to live their normal life, but other times it can powerfully affect their lives. Many children feel burdened by the demands of the disease. Quality of life is a multidimensional construct incorporating an individual's subjective perception of physical, emotional, and social well-being, including both a cognitive component (satisfaction) and an emotional component (happiness)[1].

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According to International Diabetes Federation (IDF), Diabetes mellitus has been affecting 425 million people globally and as per the estimations the number of people with diabetes may increase to 629 million in 2045.1 Out of the total, one-third of these diabetics are elderly; people older than 65 years of age. In addition to a high prevalence of DM in adults and aged the estimates of children and adolescents with T1DM is on the rising trend.[2]

It is estimated that the incidence of T1DM among children and adolescents is increasing in many countries particularly in children and adolescents under the age of 15 years, and the overall annual increase is estimated to be around 3% with strong indications of geographic differences. More than 96,000 children and adolescents under 15 years are estimated to be diagnosed with T1DM annually and the number is estimated to be more

than 132,600 when the age range extends to 20 years. The treatment for type 1 diabetes, its evaluation and the approach to the disease are different between children and adults.[3]

The high prevalence of diabetes and its related complications have attracted the researchers. In response to this, considerable research published in journals to evaluate the quality of life of diabetic and its determinants in diabetic patients.[4] These studies aimed to improve QoL in children with diabetes and provide interventions.

The current systematic review was conducted

1. to describe the general characteristics of the latest available information about QoL in people with type 1 diabetes.

2. to understand the main methodological flaws of the studies

3. to investigate how QoL was measured in Type 1 diabetic population

4. to understand the factors that were mainly associated with QoL in people with type 1 diabetes and their interventions.

Method and Materials

Literature search

A systematic literature search was autonomously conducted from October 2019 to April 2020. The researcher selected studies which assessed the Quality of Life (QoL) among children with type 1 diabetic mellitus. The results of this literature search were independently verified and updated in May 2020. Studies published up to May 2020 were included in this review. National and international databases (Pubmed, Web of Science, CINAHL, Academia) were searched for the following key terms "type 1 diabetic" and "quality of life". Other than this "type 1 diabetes, "IDDM", "QoL", "Child" , "children", "paediatric" and "pediatric" terms were used . Moreover, researcher searched the Google database for extra open access publications. Researcher followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Selection of studies

Six major inclusion criteria were adopted:

- Papers published in peer-reviewed journal (pubmed, Cochrane library, Academia.edu, open access journals)
- Papers are written in the English language
- Papers published from January 2015 to May 2020 (focus on more recent knowledge)
- Children with type 1 diabetic (0 years to 18 years)
- Cross sectional studies
- Quantitative studies

Five exclusion criteria were applied:

- QOL in people with type 2 diabetes
- Above 18 years with type 1 diabetes
- Systematic a review article

The initial search resulted in 114 documents. After excluding duplicates and non-relevant studies, 25 articles were selected for full text examination. The reference lists of these 25 documents were manually searched. In total, 12 studies were included in the review .Data extracted from the selected studies are included like a year of publication, journal name ,aim of the study, Methodology adopted in the study, the age range for the sample, sample size, a setting of the data collection, data collection tool and the result of the study.

Systematic Review of Quality of Life in type 1 diabetic children (2015-2020)

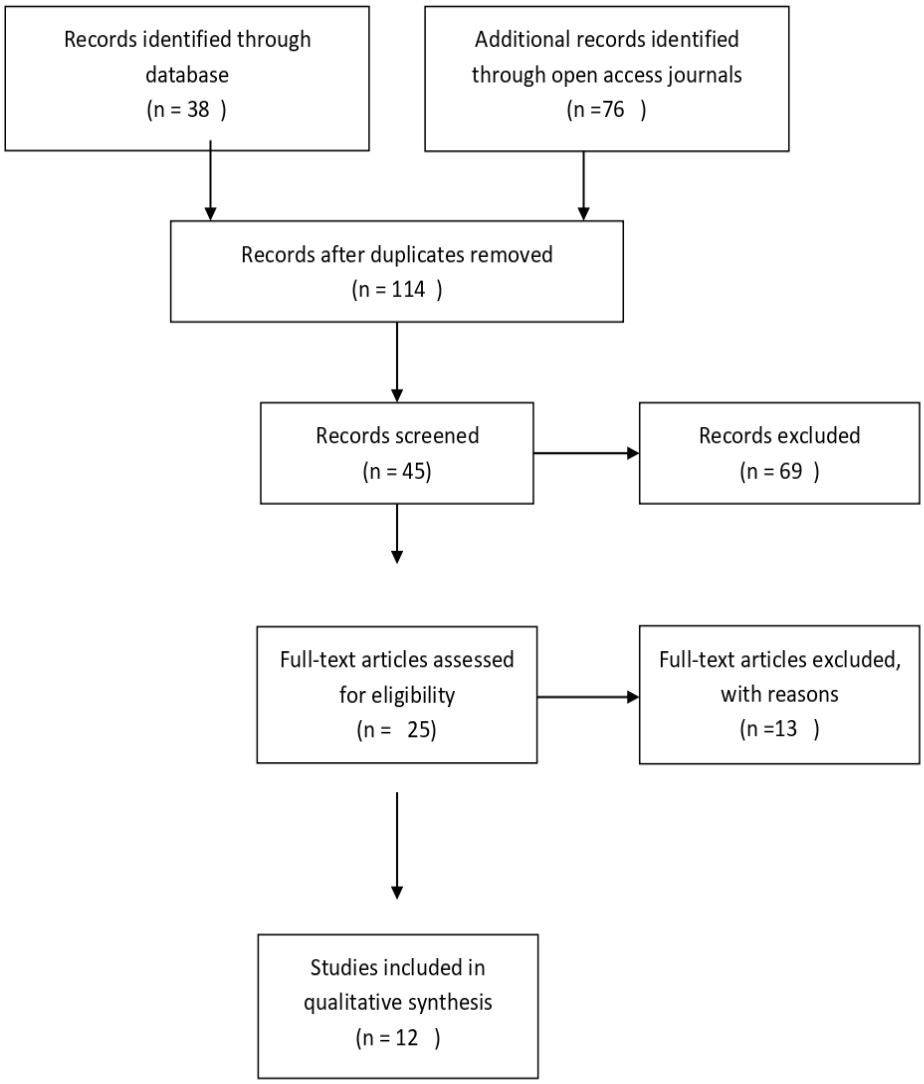

Figure 1 : Systematic review flow diagram

Table 1: Characteristics of the Systematic review studies (2015-2020)

Sr.No	Published year	Journal name	First author	Age range	Sample size	setting	Reliability & validity	Data collection year	Data collection tool	Intervention	Outcome
1	2015	Diabetology and metabolic syndrome. 5	Joao Soares Felici	10 to 19	3005	clinics	NA	2008-2010	EuroQol	NA	compared the QoL with different regions
2	2015	SCIELO analytics.6	Luce Marina F.C. da Costa	10 to 19	96	clinics	NA	2012-2014	DQOLY	NA	good quality of life
3	2016	diabetes research Aand Clinical Practice.7	Fadia AlBuhairan	12 to 18 years	315	hospitals	Cronbach's α & validaton done	NA	Peds QL™ Diabetes Module 3.0	NA	parents score is less than the adolescents
4	2016	Mindfulness.8	Inge J. P. Serkel-Schrama	12 to 18	129	NA	NA	NA	PedsQL3.2™	Mindful Parenting	positive QoL
5	2017	Journal of Diabetes & Metabolism .9	Basma AbdelMoez Ali	7-18 years	72	OPD	NA	2015	Peds QL 3.0, DM Module, CDI	NA	Poor QoL related with Depression
6	2017	International Journal of Nursing Sciences 10	Nurcan Ozyazıcıoglu	8-12 & 12-18	64	Clinic, OPD	validity and reliabilty done	2012	PedsQL	NA	no difference in parents and child views about QoL
Sr.No	Published year	Journal name	First author	Age range	Sample size	setting	Reliability & validity	Data collection year	Data collection tool	Intervention	result
7	2018	Open Access Journal of Obesity and Metabolic Disorders 11	Azimova Ozoda	8-12 &13-18	20	dispensary	high reliabilty & validity	NA	DQOLY-SF	Pump Insulin therapy	QoL improved
8	2018	Diabetes Care 12	Marie-Anne Burckhardt	2-12	49	hospital	Validity done	NA	PedsQL 4.0 , 3.0 , 2.0 DM Module	Dexcom G5 Mobile CGM	positive QoL with CGM
9	2019	Journal of Postgraduate Medicine, Education and Research 13	Rakesh Kumar	4 to 15 years	97	Clinic, hospital	Cronbach's α	2012	QOLID questionnaire	NA	QoL related to glycemic control
10	2019	Current Medical research and Opinion 14	Julio López-Bastida	under 18	275	pediatric centers	NA	2014	EQ-5D and PedsQL	NA	HbA1c related to HRQOL.
11	2020	International Journal of Health Sciences and Research [2]	Niraj Kumar	6−18	140	hospital	NA		DAWN QolY, DTSQ, DSQoL,SDQ	NA	depend on the disease condition
12	2020	Diabetes technology & Therapeutics[15]	Manuela Sinisterra,	2 to 5	46	hospital	NA	NA	HRQOL	CGM	sleep improved

Results and Discussion

General characteristics

The first objective was to describe the general characteristics of the latest available information about QoL in people with type 1 diabetes. The characteristics of the 12 eligible studies for this systematic review are shown in Table 1. The first 2 studies were published in the year 2015 and since then there were few publications per year on QoL of children with type 1 diabetes. In the year 2015 to 2020 the publications are distributed twice per year except in 2019, where no publication on the topic found relevant. All studies were published in different countries with 2 Indian publications on the topic of Quality of life in children with type 1 diabetes. Sample sizes across the studies ranged from 20 to 3005 participants. All the studies published in the English language . In all the studies, participants age group is below 18 years that is, children and adolescents. Two studies compared the QoL of Children with Adolescents . In all the studies ,children below 12 years were participated and their parents marked the QoL for children.

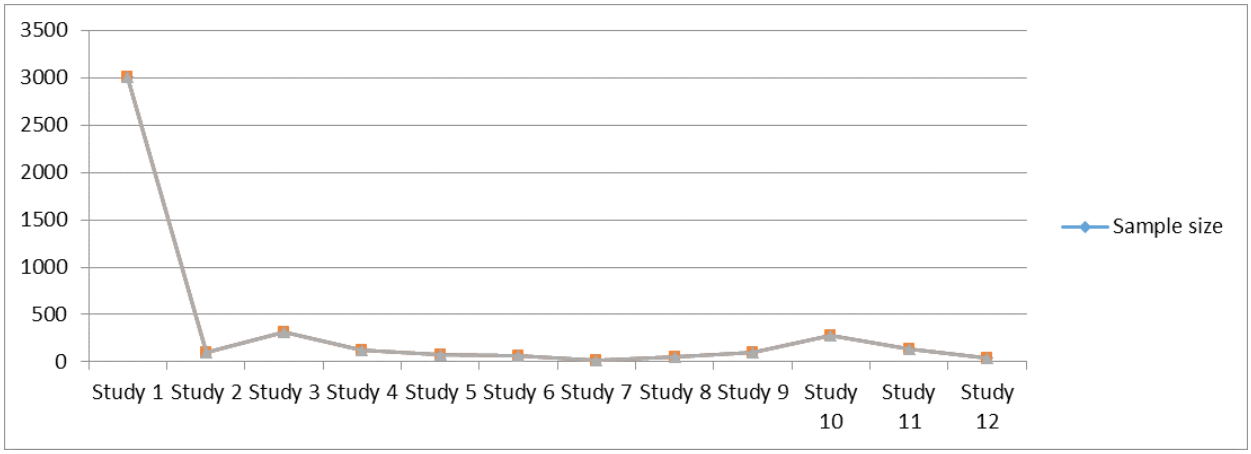

Figure 2 : Sample size distributions in the QoL of type 1 diabetic children from 2015-2020

The second objective was to understand the main methodological approach of studies .The data was collected from the samples mostly from the hospital, OPD, Clinic, Pediatric centers and in one study data collected in endocrinology dispensary also. In 7 studies reliability details weren't stated. However, in two studies type of reliability (Cronbach's α) mentioned clearly .Also, from all of the 12 studies only one study mentioned about the validity and it stated that 10 experts performed the validity of the tool. Around, 8 studies doesn't mentioned about the validity and other 4 studies declared that validity and reliability done.

The third objective was to investigate how QoL was measured in Type 1 diabetic population .In 6 studies data collection year is not mentioned. The other 6 studies data collection year ranges from 2008-2015. Furthermore, 6 studies used PedsQL for data collection. Different module of PedQL is used for the data collection like of PedQL 2.0, of PedQL3, of PedQL 3.2 module was used to check the Quality of life in children. Others used QOLID questionnaire, EuroQol , DQOLY-SF, DAWN QolY, and DQOLY.Apart from this, studies evaluated QoL as a main variable.Also, 4 studies checked the other variables like depression, sleep and other variables that affect the diabetic children. They have used other tools like DTSQ, DSQoL,SDQ and CDC to check the above mentioned variables.

The effects of interventions

The fourth objective was to understand the factors that were mainly associated with QoL in people with type 1 diabetes and their interventions .A total of 12 studies examined the effects of an intervention on QoL in people with type 1 diabetes. Eight studies doesn't have any interventions as it checked only the quality of life in children. Two studies procured continuous glucose monitoring (CGM) as an intervention . In that one study used Dexcom G5 mobile for CGM monitoring. One

study used the Pump insulin to improve the Quality of Life and other study used mindfulness practices to improve QoL. However,it is observed that the majority of the studies preferred to do surveys and 3 studies used invasive practices to improve the Qol while one study used non-invasive supportive measurement to improve QoL that is mindfulness practices.

The researchers who focused on the QoL with interventions especially with Continuous Glucose Monitoring(CGM) showed slight improvement or higher level of improvement in part of Quality of Life. Research with mindfulness practices showed the improved QoL after the practice. The researchers Who compared the QoL in both groups like adolescents and children showed not much different in their QoL.One study compared the Qol with glycemic control and it proved that QoL is depend on the glycemic control. According to the stability of the glycemic control the QoL will change. Other research studies evaluated the HbA1c with QoL and it also proved that enhanced QoL with reduced HbA1c level. One study which was published by Niraj Kumar in 2020 states that depend on the severity of the disease condition QoL will change. One study which is published by Basma AbdelMoez Ali explained that parent's predition of QoL is less than that of adolescents score about their conditions. Other studies showed the comparison of QoL in different aspects like with regions of the country , with depression level of the children, with other age group and with sleep also.

Clinical Implications

Overall, many studies showed improvement in QoL of children especially after the glycemic control and Continues Glucose monitoring. These type practices should be improved in children with type 1 diabetes. The Psychological impact is also beneficial to the children like mindfulness practices. None of the studies evaluated about the educational interventions which can be a helpful for children, adolescents and anxious parents. Technological innovations like mobile applications and active monitoring need to be used for these children and they must be practiced by parents , children and health care workers. Only one study used a mobile application to monitor CGM and proved the effect in QoL.

Conclusion

This present review of the literature showed that people with diabetes had lower QoL however the Quality of Life is directly related to the disease condition, HbA1 c and glycaemic control of children . Better control of diabetes mellitus is associated with better health related QoL. Paediatricians, nurses, parents and other health care workers should continue their researches with long term interventions to improve quality of life the children.

Ethical Consideration: Ethical approval of the study taken from Bharati College of Nursing ethical committee.

Funding : Authors have no financial support to this project. The study was fully funded by authors.

Conflict of Interest: The author has no conflict of interest

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