

# Current Indicators of Nutritional Care in Children with Type 1 Diabetes in India: Do we Need a National Nutritional Guideline?

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## Abstract

**Background:** Nutrition is an important pillar of management in children with type 1 diabetes. Indian food is heavily influenced by region, religion, traditions, seasons, and cultural choices. This survey was done to assess current practices and the need for India specific nutritional guidelines for children with type 1 diabetes. **Materials and Methods:** Two 12-item questionnaires were administered to forty health-care professionals across India. The first questionnaire evaluated current clinical practice indicators for nutrition in these children and second assessed practices for counseling a child on dietary habits. **Results:** There is great heterogeneity across the country with regard to dietary advice offered to children with type 1 diabetes. 97.5% of the respondents feel there is a need for an Indian dietary guideline for children with type 1 diabetes. **Conclusion:** There is need of India specific nutritional guidelines that should be made considering key variants such as age, region, cultural preference, economic burden and psychosocial beliefs, to offer guidance to diabetes care professionals.

**Keywords:** Dietary recommendations, healthy recipes, nutritional guidelines, psychosocial beliefs, regional cuisine

## INTRODUCTION

Type 1 diabetes mellitus is the second most common chronic disease in children in India. It accounts for 5%–10% of all diagnosed cases of diabetes mellitus<sup>[1]</sup> and has an incidence of 3 cases/year/100,000 (International Diabetes Federation atlas 7<sup>th</sup> edition). It results from a cellular-mediated autoimmune destruction of the  $\beta$ -cells of the pancreas. People with type 1 diabetes do not produce any insulin, resulting in high blood glucose levels.

The main aim of any treatment of diabetes is to maintain glucose levels within normal range. For children with type 1 diabetes, no other treatment works other than insulin. Adequate management of type 1 diabetes requires intensive insulin treatment, monitoring, and lifestyle changes. A child or person with type 1 diabetes needs to take insulin on a regular basis and match the food intake and exercise according to the action and dose of insulin. Nutrition is one of the most important pillars of diabetes management. Understanding how different foods affect blood glucose levels and learning to

develop solid meal plans is a crucial part of the daily routine of children affected with type 1 diabetes. All children with type 1 diabetes need to receive nutrition counseling. Meal plans must be individualized to accommodate food preferences, cultural influences, physical activity patterns, and family eating patterns and schedules. It must also be noted that nutritional needs of children with type 1 diabetes are different from those of adults with type 2 diabetes.

Indian food is heavily influenced by region, religion, traditions, seasons and cultural choices. Along with that, it is also affected by economic, social, political, occupational and ecological factors. Different cuisines vary significantly from each other in terms of ingredients and preparation methods.

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The goal of treatment is to aim for a blood glucose target range, which corresponds to 70–130 mg/dL<sup>[2]</sup> before a meal and <180 mg/dL 2 h after the start of a meal. Maintaining this range is crucial for prevention of diabetes-related complications. Insulin, nutrition, exercise, and monitoring are all essential to achieve this goal. Nutrition recommendations<sup>[3]</sup> for children and adolescents with type 1 diabetes are focused on achieving blood glucose goals without excessive hypoglycemia, lipid and blood pressure goals, and normal growth and development. Although we find various nutritional guidelines, recommendations and methodology for children with type 1 diabetes but India-specific guidelines seem to be missing. It is not very apparent which nutrition guideline or methodology works best for Indian children in various age groups and situations. Most of the health-care professionals in India are using a blend of these various guidelines and modifying them into the needs of an Indian child with type 1 diabetes. It is very essential to have an India-specific guideline, based on evidence and Indian needs, for the betterment of children with type 1 diabetes.

## MATERIALS AND METHODS

### Objectives

This attempts to bring out dietary prescription practices for children with type 1 diabetes in India from the rich experience of a group of health-care professionals.

### Scope

The survey was an indicator of the:

- Current practices and guidelines followed by health-care professionals (HCPs) while prescribing diet for children with diabetes
- Various criteria used and methods followed while prescribing diet
- Various situations and variables which affect the diet of the child
- Various barriers to adherence and acceptance of diet
- Proportion of children who are not able to follow dietary prescription.

The aim was to get an overview of the current dietary guidelines for children with type 1 diabetes and not a means of recommending a dietary guideline.

### Methods

The primary data were collected using questionnaires [Questionnaire 1 and 2 as attached in Appendix 1] which were sent to participants either by E-mail or in person and were returned by respondents at their will. Questionnaire 1 was meant for obtaining data on current guidelines and dietary practices followed by doctors and other health-care professionals. Questionnaire 2 was meant to gain an understanding of practical aspects of dietary guidelines such as counseling practices and recommendations.

The target audience for these questionnaires was HCPs who were dealing with children suffering from type 1 diabetes.

Total number of responders were forty, which consisted of pediatric endocrinologists ( $n = 4$ ), endocrinologists ( $n = 9$ ), diabetologists-MD ( $n = 8$ ), diabetologists-MBBS ( $n = 8$ ), dieticians ( $n = 7$ ), and diabetes educators ( $n = 4$ ). It is essential to note that participants were allowed to choose more than one option for some questions.

## RESULTS

### Observations based on questionnaire 1

With an exception of 1 (2%) respondent (diabetologist), all the other HCPs felt a need for having a dietary guideline for children with type 1 diabetes in India.

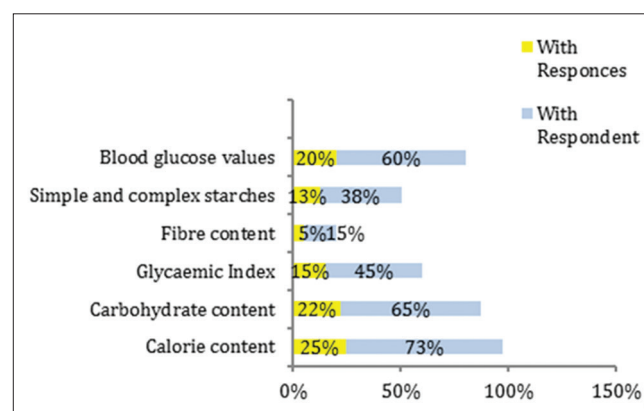
Regarding guidelines in the current use, 40% of the respondents use the age-specific nutrition for children, along with avoiding simple sugars, for prescribing diet for these children. Thirty-five percent of the respondents used the International Society for Pediatric and Adolescent Diabetes (ISPAD) guidelines<sup>[4]</sup> and 30% had their own center-specific methods. While more than one guideline was followed in many centers, around 20% used the American Diabetes Association (ADA) nutritional guidelines<sup>[5]</sup> for people with type 2 diabetes.

When questioned regarding preferred methods of prescribing diet, 65% of HCPs mentioned that they note the diet history of the child and provide individualized meal plans. Along with this, printed diet charts (30%), plate method<sup>[6]</sup> (20%), and pyramid method<sup>[7]</sup> (18%) were the other two methods frequently used for diet prescription by HCPs.

Figure 1 shows majority of HCPs mentioned calorie content, carbohydrate content, and blood glucose values as the most important aspects to be considered while suggesting diet for a child with type 1 diabetes.

The majority of the HCPs (39 out of 40) felt that it is important to teach diet adjustments in a meal plan, so that a child with type 1 diabetes can have food according to their wish.

The use of food exchange lists remained the most preferred method (voted by 65% HCP) for teaching diet adjustment [Figure 2].



**Figure 1:** While suggesting diet for a child with type 1 diabetes, which are the three most important things to consider?

Figure 3 shows according to majority of HCPs, parent education (58%) and family support to the child (55%) play an important role in diet adherence. Age is another very important factor on which diet adherence depends. Financial condition, physician–patient relationship, and parents’ belief play a much smaller role in diet adherence, according to the HCPs.

Figure 4 represents how practical guidelines for diet in various situations and special environments are being given. According to the responses received, 25% respondents do not offer any guideline. Majority of the time, guidelines to be followed when sick and during school are given. Dietary guidelines to be followed during festivals while attending party and during traveling are given only around 50% times. Guidelines to be followed during fasts are given least importance (18%).

When questioned about the frequency of giving guidelines to the patients, 88% HCPs answered “as a routine,” while 30% answered, “during camps.” Total 25%, 18%, and 15% reported as “written,” “verbal” and “on request,” respectively.

Figure 5 indicates that giving revised and repeated diet prescriptions is the most important element for diet adherence as per the HCPs. Giving healthy recipes as a part of the dietary guideline and asking parents and siblings to follow the same

diet, also play an important role in facilitating adherence to dietary guidelines.

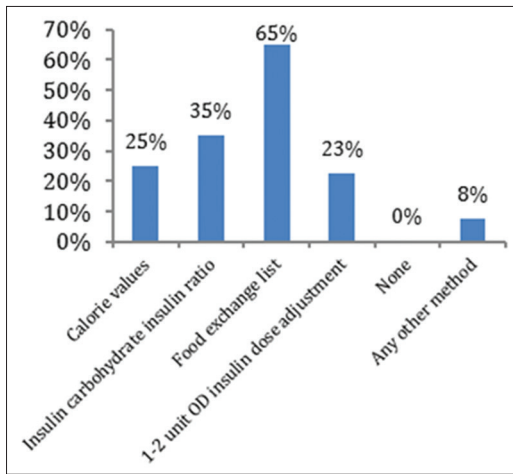
In response to a query on adherence, it was found that around 50% of children are not able to follow prescribed diet. Respondents were asked an open-ended question as to what points should be covered in the proposed guidelines. These included:

- Carbohydrate content of various Indian food preparations
- Mix and match techniques (with quantity described) to make every food healthy, for example, dal chawal, potato fingers, and sprouts
- Counseling techniques for both child and parents
- Recipes of low-calorie desserts
- Recipes based on regional cuisine
- Age-specific guidelines
- Notes for diet in various situations such as school, festivals, and birthday parties.

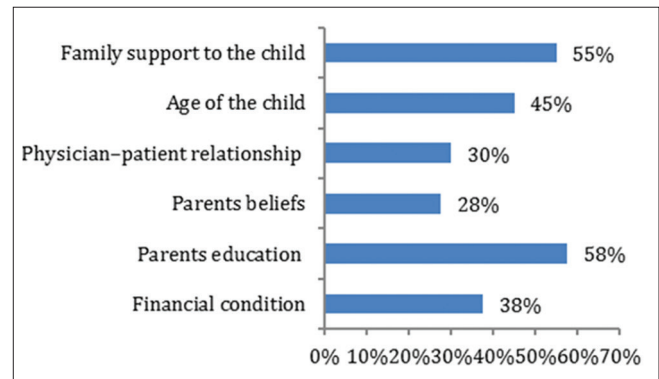
**Observations based on questionnaire 2**

When HCPs were questioned about the “Practices for counseling a child on dietary habits” results indicates that child’s dietary habits, regime, and culinary culture are assessed 88% of the times before prescribing diet.

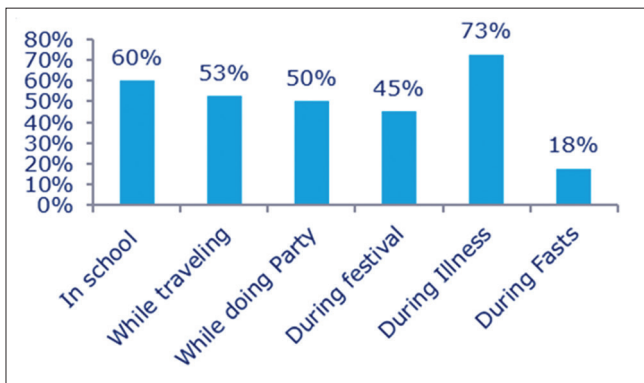
Totally, 98% of the HCPs responded that they note the current weight and physical activity while prescribing a diet to any child with diabetes.



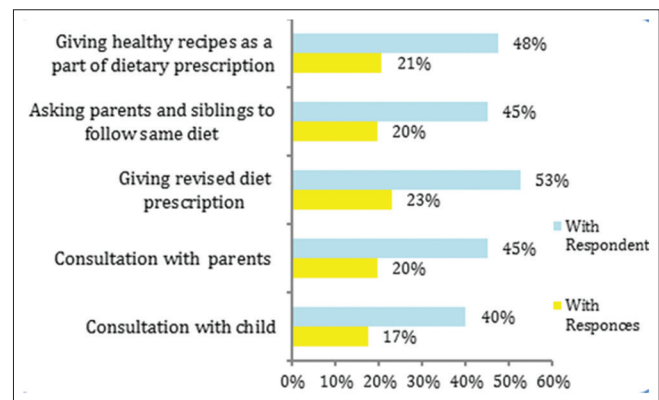
**Figure 2:** How do you teach diet adjustments for children?



**Figure 3:** According to you, which factors play an important role in diet adherence?



**Figure 4:** When in different environments and special situations, are practical guidelines given on diet for the child with type 1 diabetes?



**Figure 5:** What are the crucial elements which can ensure better adherence to dietary guidelines?

Only 3% of HCPs answered that they say “no” to sweets for children with diabetes. Seventy-five percent of HCPs allow children with diabetes to have sweets occasionally, but very few children get quantified guidelines to follow while eating sweets such as once in week or once in a month.

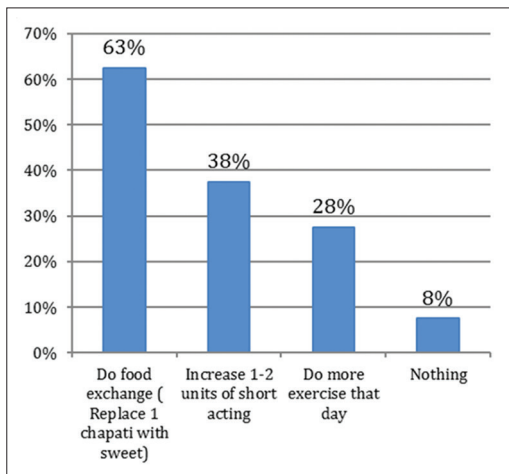
Figure 6 indicates how food exchange method remains the top choice to be followed while following diet and allowing sweets for children with diabetes, rather than insulin dose adjustment.

Except of one HCP, all other believed that no major intervention for proper nutrition is needed if the child is taking a balanced diet which includes all fruits and vegetables. Six HCP mentioned that child-specific modification maybe required.

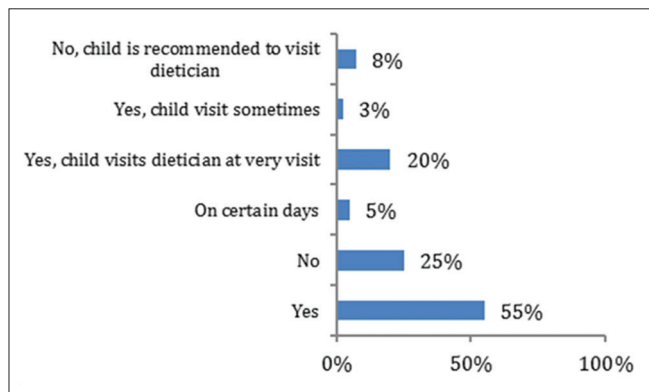
Figure 7 shows more than 50% of HCPs do not allow artificial sweeteners for any child with type 1 diabetes, those who allow, do so after a certain age or with a condition. Only 15% of HCPs recommend any type of artificial sweeteners.

Majority (83%) of HCP answered in the affirmative when asked about if they teach patients about dose adjustment for short-acting insulin according to the meal they want to have.

Figure 8 shows and 55% clinics have a registered dietician. Only 8% of children are not visiting any dietician.



**Figure 6:** If allowing sweets, while doing it what piece of advice do you give?



**Figure 8:** Do you have a registered dietician attached to your office and how many child visits them?

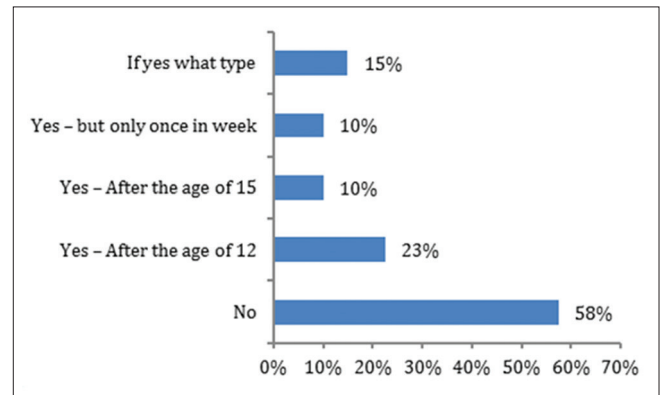
Figure 9 below indicates that in case of nonadherence of dietary advice, 80% of HCPs give special counseling sessions for children and parents and around 60% provide alternatives for food in the hope that the, “diet pillar” of diabetes management is properly maintained.

## DISCUSSION

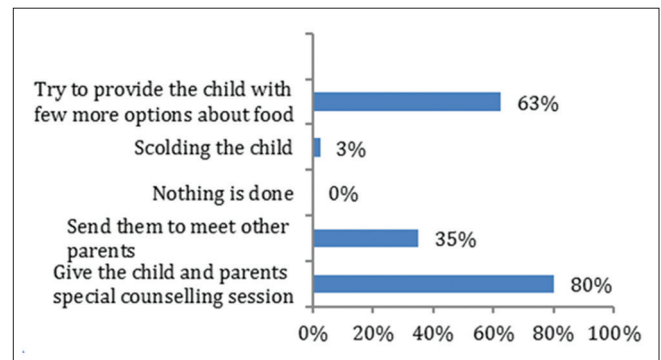
Care of children with diabetes presents multiple unique challenges. These include the need to focus on proper growth and development while managing glycemia and parental influence. There is no doubt that nutritional management is one of the cornerstones of diabetes care and management. Dietary recommendations for children with diabetes need to be based on healthy eating recommendations suitable for all children and adults<sup>[5]</sup> and so the whole family. This nutritional advice must be adapted to cultural, ethnic and family traditions, and the psychosocial needs<sup>[8]</sup> of the individual child. This statement is emphasized multiple times in our study, which reveals wide diversity in the nutritional management of pediatric type 1 diabetes in India.

Our key findings are as follows:

- As recommended in ISPAD guidelines,<sup>[4]</sup> the nutritional advice needs to be adapted to cultural, ethnic and family traditions, as well as the cognitive and psychosocial needs of the individual child. In fact, although, there are



**Figure 7:** Is child allowed to have artificial sweeteners?



**Figure 9:** While counseling children and their family, what do you do if the child is not adhering to diet?

multiple international guidelines, 70% HCP's prefer to use either their own method or normal age-specific diet along with asking the child to avoid simple sugars. Most HCPs suggest consideration of regional culinary habits while formulating guidelines

- Medical nutrition therapy is an important cornerstone of diabetes management since ages. As stated by EP Joslin, (1933), "I look upon the diabetic as charioteer and his chariot as drawn by three steeds named Diet, Insulin, and Exercise." Although in 85% of clinics, dietary prescriptions are given routinely, 15% still lack it. In addition, on an average, more than 50% of the children are not able to follow diet as prescribed by HCP's
- Parent education on diet seems to be the most important method adopted to ensure proper recommended diet adherence
- It was observed that consistency of food intake (carbohydrate) is important for children and adolescents who are on fixed insulin regimens and do not adjust premeal insulin dosages
- Nearly 83% of HCPs teach children to adjust short-acting insulin doses according to meal on regular basis, and 63% of them also advise food exchange to have sweet in diet
- The ADA guideline allows 2–3 teaspoons of sugar per day to children with type 1 diabetes who are not overweight, but 75% of HCPs do not give any clear-cut recommendations, and allow sweets "occasionally" for children with diabetes, which may be interpreted differently by different children
- Most HCPs do not allow artificial sweeteners while those who do, allow it after a certain age, i.e., 23% after 12 years of age, 33% after 15 years of age. Some doctors allow artificial sweeteners only once in a week.

### Limitations

Our study is a questionnaire-based survey. Although we have ensured pan-India coverage, and representation of all specialties involved in nutritional care of pediatric diabetes, some practices may have been missed.

### CONCLUSIONS AND RECOMMENDATIONS

The current study does not, in any way, aim to delineate management guidelines. Rather, it serves to highlight the diversity of current practice and to underscore the need for Indian guidance on this topic. Such guidelines should be comprehensive, yet allow individualization, and complete, yet offer scope for flexibility. They should be based on not only endocrine and pediatric principles but should also incorporate psychological, nutritional, and culinary science. The guidelines should allow variation based on age, finance, and psychosocial preferences. Focus on counseling techniques to enhance adherence is necessary. Specific guidelines for the use of simple carbohydrates, sick day management, and feast management must be included in this study.

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### Conflicts of interest

There are no conflicts of interest.

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## APPENDIX 1

### Questionnaire 1

Name –

Qualification-

Set up where working –

City-

“Current Practice Indicators of nutrition care in children with type 1 diabetes in India” for bringing dietary recommendations for children with type 1 diabetes in India

If there is more than 1 correct answer, then restrict yourself to top 3 options

Q1 Do we find there is a need for dietary guidelines for children with type 1 diabetes in India?

Yes/ No

Q2 In your clinic, which guidelines do you follow while prescribing diet to children with type 1 diabetes?

- A) ADA nutrition guidelines for type 2 diabetes
- B) Joslin Meal planning Guide
- C) Nutritional management in children and adolescents with diabetes – ISPAD
- D) Normal age specific nutrition for child – Simple sugars to be avoided
- E) Your own method
- F) Any other guideline \_\_\_\_\_

Q3 In your clinic, while prescribing diet, what method do you follow?

- A) Diet chart printed/ patient information guide
- B) Taking their diet , giving individual diet - Meal plan template
- C) Plate Method
- D) Pyramid Method
- E) Traffic light signal diet
- F) Any other method \_\_\_\_\_

Q4 While suggesting diet for a child with type 1 diabetes, which, are the three most important things to consider?

- A) Calorie content
- B) Carbohydrate content
- C) Glycaemic Index
- D) Fibre content
- E) Simple and complex starches
- F) Blood glucose values

Q5 Do you think it is important to teach how to make diet adjustments in a meal plan to a child with type 1 diabetes according to their wish?

- A. No, a child should follow fixed diet. (Please go directly to q7)
- B. Yes ( Please tell us which plan through q 6)

Q6. How do you teach diet adjustments for children?

- A) Calorie values
- B) Insulin carbohydrate insulin ratio
- C) Food exchange list
- D) 1-2 unit OD insulin dose adjustment
- E) None
- F) Any other method \_\_\_\_\_ -

Q7 According to you, which factors play an important role in diet adherence?

- A) Financial condition
- B) Parents education
- C) Parents beliefs
- D) Physician–patient relationship
- E) Age of the child
- F) Family support to the child

Q8 When in different environments and special situations, are practical guidelines given on diet for the child with type 1 diabetes?

- A. In school
- B. While traveling,
- C. While attending party
- D. During festival
- E. During Illness
- F. During Fasts

Q9 When is the above guidelines given?

- A. On Request
- B. As a routine
- C. Written
- D. Verbal
- E. During camps

Q10. What are the crucial elements which can ensure better adherence to dietary guidelines?

- A) Consultation with child
- B) Consultation with parents
- C) Giving revised diet prescription or different options if the child is not able to follow
- D) Asking parents and siblings to follow same diet
- E) Giving healthy recipes as a part of dietary prescription

Q11 What percentage of children roughly, do you think are not following diet?

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Q12 Write any one important thing which you would like to include in dietary guidelines made for children with diabetes in India?

## Questionnaire 2

Practices for counselling a child on dietary habits

Q1 Do you assess a child's dietary habits, regime and culinary culture of the family initially?

- A. Yes
- B. No
- C. Sometimes

Q2 Do you note the current weight and physical activity while giving the diet?

- A. Yes
- B. No
- C. Sometimes

Q3 Do you allow sweets / sugar for a child with type 1 diabetes?

- A. NO
- B. Yes (2 tea spoons of sugar) per day
- C. Yes – 1 sweet once a week
- D. Yes – 1 sweet once in 2 weeks
- E. Yes – 1 sweet per month
- F. Yes (occasionally)

Q4 If yes, while doing it what piece of advice, do you give?

- A. Do food exchange ( Replace 1 chapati with sweet)
- B. Increase 1-2 units of short acting
- C. Do more exercise that day
- D. Nothing

Q5 How do you ensure that child is taking enough nutrients, proteins and fibre for healthy living? Does Your prescription includes

- A. Balanced diet which includes all fruits and vegetables
- B. Vitamin pills
- C. Protein powder
- D. Depends upon child to child
- E. Till the blood sugar levels are fine, no intervention is done



Q6 Is child allowed to have artificial sweeteners?

- A. No
- B. Yes – After the age of 12
- C. Yes – After the age of 15
- D. Yes – but only once in week
- E. If yes what type\_\_\_\_\_

Q7 When eating outside, what recommendations are given?

- A. No eating outside
- B. Very less (once in a month or 2months eating outside)
- C. Teaching Carbohydrate insulin ration and taking extra insulin
- D. Teaching food exchange ratios

Q8 Do we teach children to adjust short acting insulin doses according to meal on regular basis?

- A. Yes
- B. No

Q 9 Do you have a registered dietician attached to your office and how many child visits them?

- A. Yes
- B. No
- C. On certain days
- D. Yes, child visits dietitian at very visit
- E. Yes, child visit sometimes
- F. No, child is recommended to visit dietician