



# Designing survey questionnaire for assessment of nutritional knowledge of parents

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## Abstract :

**Aim:** To elaborate the development, validity and reliability of the designed nutritional knowledge questionnaire designed for parents of preschool aged children of Indian population.

**Methods:** The questionnaire developed was a structured interview schedule and consisted of 3 sections namely – section A, B & C for general information, socio-demographic profile & knowledge of parents, respectively. Section A consisted of 5 categories (total 9 items), section B has 7 categories (total 25 items) and section C included 7 domains/ categories (total 43 items). The questionnaire was developed by the primary investigator evaluated for content validity by an expert panel and checked for reliability by test re-test method and Karl Pearson's correlation formula. Pilot study was also conducted to assess the practical & methodological feasibility of the questionnaire as tool for the present study.

**Result:** The content validity for final draft of questionnaire needed various modification before final administration. The post-administration of the questionnaire on subjects/ parents in pilot study revealed that the questionnaire is valid. In the reliability check with test re-test method, the questionnaire provided similar results on its repeated administration. And with Karl Pearson's correlation formula, coefficient correlation was found to be  $r = 0.84$ . Thus, the questionnaire was found and ensured to be reliable for the study purpose.

**Key Words:** Designing, Survey, Questionnaire, Nutritional Knowledge, Parents.

**JEL Categories Applicable:** I15, I31, I38, I39

**Abbreviations:** NCDs – Non Communicable Diseases, NDDs – Nutritional Deficiency Diseases, MNDs – Micro Nutrient Deficiencies, U5 – Under five years children, SDGs – Sustainable Development Goals, GHI – Global Hunger Index, NFHS – National Family Health Survey, KAP – Knowledge, attitude & practice, NEPM – Nutrition education program module, RDA – Recommended dietary allowances

## 1. INTRODUCTION:

NCDs are the global public health concerns and various factors are contributing in dramatic changes in the dietary behaviours of people and communities. The population of children is the most affected section and is also most vulnerable to develop NDDs like malnutrition & anemia (1). According to recent reports & studies childhood malnutrition and anemia are the major public health epidemic concerns and are most prevalent in vulnerable population of children (2, 3). Recent global report on South Asia revealed that the children globally are facing triple burden of malnourishment i.e. underweight, MNDs and overweight/obesity. Approx. 10 million children are globally underweight, 350 million U5 are suffering from MNDs and obesity rates rose by 10 to 12 percent globally (8).

India as developing country is undergoing through major transitions in epidemiological and mortality status, particularly in children. Due to high rates of growth retardations and epidemic state of NDDs there is an exigency to achieve desired & targeted SDGs for improved health among children (4).



As per latest report of GHI – 2017, India upheld the 100<sup>th</sup> rank among 119 nations studies worldwide and also leading on 3<sup>rd</sup> highest position in Asian continent (1). According to NFHS-4 reports 38% children <5 yrs. are stunted, 21% wasted, 36% underweight, 2% overweight and 58% were anemic which by NFHS-5 rose by stunting in 36%, 19% wasted, 32% underweight, 3% overweight and 67% anemic in U5 children category (6, 7).

According to recent report of Bhushan, C. et al., 2017, published by Centre for Science and Environment, there is a inefficiency in consumption of balanced diet. 66% children were reported with poor cereals & millets intake, 73% with poor pulses & legumes intake, 45% with poor vegetables intake, 54% with poor milk & milk products intake, 65% with poor fruits intake, and 49% had poor consumption of protein sources (including plant & animal sources). While on the other hand, 53% children were recorded with consumption of highly processed & salted foods like chips, instant noodles, etc. i.e. twice a week, 56% children with consumption of packaged & highly processed sweet products like chocolates, ice-creams etc. i.e. > twice a week and 49% with intakes of highly processed sugar beverages like cola, packed juices, etc. It was also reported that 83% children consume milk with milk-supplement drinks and 69% children eat breakfast cereals along with milk (1). Latest studies observed that parental KAP has a strong link with child nutritional status, particularly for U5 children. It had also been discovered in the recent reports that in past few decades most of the researches had focused on mother's KAP and participation towards children nutritional status as their primary caregiver. But the role & participation and KAP of fathers as the main bread-winner and key decision maker for the family has been yet under-studied. Due to this, the gap between parental (mother & father both) KAP and child nutritional status has gone enlarged, particularly in last few years (9). Latest studies conducted emphasized on educating parents for child nutrition & healthy nutritional attitudes & practices for improvement in their health status (10).

Recent reviewed researches focused on child nutrition intervention promoted nutritional KAP and healthy food behaviour and had also highlighted the success of educational intervention in child nutrition combining school and family level participation & initiatives (11, 12, 13). More recently, George, P. S. et al., 2021 had outlined nutrition education as a prime mode to promote cost-effective nutritional dietary inculcation among parents & children both (13). The objective of the present paper is to elaborate the development, validity and reliability of the designed nutrition knowledge questionnaire (interview schedule) specifically designed for parents of preschool aged children (3-6 years) of Indian population.

## **2. METHOD:**

### ***Development of a survey questionnaire***

The questionnaire developed was a structured interview schedule and was made as per the suitability for application for the study purpose.

### **Practical Considerations**

The main consideration was to produce a test suitable questionnaire for the pre and post interventional assessment that could be administered within 15-20 minutes for parents under study. Considering the language constraints of participants the questionnaire was initially developed in English and was later translated in Hindi before administration on subjects.

### **Content Domains**

In designed structured interview schedule the overall questionnaire was developed to assess the socio-demographic profile and knowledge of parents. The questionnaire consisted of 3 sections – A, B & C. Section A was general information about the child under study, section B was socio-demographic profile of parents and section C was for the assessment of nutritional knowledge of parents under study.

Section A (general information) included total 5 categories namely – respondent relation to child, child' gender, date of birth, food habits, and residential area.

In section B (socio demographic profile) 7 categories were included namely – religion, father's education, father's occupation, mother's education, mother's occupation, monthly family income and type of family.

The section C was for the assessment of nutritional knowledge of parents. This section questions related to nutritional knowledge. An attempt was made to give a holistic approach to this section of the questionnaire.

The categories for designing the questions included in section C were also identified as the main areas aimed for the further development of the nutrition education program module (NEPM).



### Question Topics, Design & Format

In section A for general information total 9 items were included. The respondent's relation to child category included 2 items namely – father & mother, gender category included 2 items namely – male & female, the date of birth category is open ended question and was later sub-categorized after data collection for interpretation, family food habits included 3 items namely – vegetarian, non-vegetarian and eggitarian, and residential area included 2 items namely – urban & rural.

In section B for socio-demographic profile total 25 items were included. The religion category included 3 items namely - Hindu, Muslim & others, education category for father & mother included 7 items (separately for each) namely – professional course? P.G./ higher, graduate, intermediate (12<sup>th</sup>), high school (10<sup>th</sup>), middle school certificate (8<sup>th</sup>), primary school certificate (5<sup>th</sup>) & illiterate, the category of occupation for father & mother included 3 items namely - govt. service/ pvt. job, business/ self employed and unemployed/ housewife (separately for each). The category of monthly family income (in rupees) is an open ended question and the items (sub-categories) in it were categorized after data collection on the basis of overall participants response, and the category of type of family included 2 items namely – nuclear family and joint family. The socio-economic status was assessed separately by the investigator on the basis of monthly family income category ranges obtained after data collection.

The section C of the questionnaire was for the knowledge of parents. The questions of this section were designed with a holistic approach and to assess the nutritional knowledge of parents with intent to further improve their nutritional knowledge and nutrition status of their preschool aged children. The categories from which questions were developed were initially identified at school, by parents & experts and nutritional issues prevalence levels (at global, national & state levels). A wide range of categories were identified and final decision were made based on the most concerning categories which are also suitable for the preparation of the NEPM further, that would serve the purpose of this study. All the categories included for questionnaire designing were discussed with the parents under study which are the main participants and experts in paediatrics, nutrition, public health & research, for the tools development.

In this complete section total 43 questions were included. The questions were from the categories given below –

- 1) Food & food groups
- 2) Nutrients, their functions & sources
- 3) Balanced diet
- 4) Food diversity
- 5) Junk & processed foods
- 6) RDA & dietary considerations
- 7) Major nutritional problems ( including malnutrition & anemia)

The questions in the section were provided with more than one option in every question, and in them one option was correct and others were wrong/deviators. The subjects/ parents were asked to choose one option as their answer from the options given to them.

In the design process, the questions were designed in the simple language for their better understanding & seeing the practical applicability of them for the study purpose. The no. of questions included in each category is as follows –

- 1) Food & food groups (2 questions)
- 2) Nutrients, their functions & sources (14 questions)
- 3) Balanced diet (3 questions)
- 4) Food diversity (1 question)
- 5) Junk & processed foods (1 question)
- 6) RDA & dietary considerations (6 questions)
- 7) Major nutritional Problems (16 questions)

In section A, B & C the responses/options were presented in multiple choice formats in all questions, except in monthly family income. The subjects were asked to choose one option as answer among the options provided for each question in all 3 sections. For the items in section A & B, nominal scale was adopted and all the items were allotted numbers from 1 to 7, as per the requirement of each category. In section C, the scores of “0” and “1” were allotted to each question. Score “1” was given to the correct/positive answer and score “0” was given to the wrong/ negative answers. An answer sheet was prepared separately which contained all the right answers of all the questions which were used for giving the scores to the questions answered by the subject. The maximum score in section C is 43.



### ***Validity & reliability testing of questionnaire***

The content validity of the questionnaire was ascertained by a selected panel of 5 experts. The first draft of questionnaire was sent to all the experts for validation. The selection & empanelment of the experts was done on the basis of their experience, expertise and interest in the study area. The expert panel for the present study included - 2 research experts, 1 dietician with specialization in paediatric nutrition & dietetics, 1 senior and well-known pediatrician and 1 public health expert. Their inputs, suggestion and opinions were incorporated in the questionnaire and modifications were made according to their inputs for the construction of final draft of the questionnaire for implementation for study purpose.

The reliability of the questionnaire was checked by test re-test method and Karl Pearson's correlation formula. For the assessment of the reliability with test re-test method, the questionnaire was administered two times with the gap period of 7 days.

### ***Format of questionnaire presentation***

In the final format, the questionnaire of the structured interview schedule was divided into 3 main sections i.e. general information, socio-demographic profile and knowledge of parents, which were covered in almost 7 pages according to font size. After the final draft, the questionnaire which was initially prepared in English was also translated in Hindi for the subjects.

### ***Pilot study***

Though the validity and reliability of the designed questionnaire was ascertained by the expert panel, a pilot testing was done to assess the practical & methodological feasibility of the questionnaire. For the pilot study two schools were selected from the study area. Under the super vision of concerned school authorities, the investigator met with the parents whose children were studying in school at the time of pilot study. The pilot study included total 30 parents i.e. 15 from each school. Parents were pre-informed for the administration of the questionnaire by the school authorities as asked by the investigator. On questionnaire administration day parents were briefed out about the purpose of study and questionnaire administration properly to develop better understanding and gain confidence of the subjects/ parents. The subjects/ parents were made seated comfortably and were asked to come one-by-one and administration of questionnaire was done systematically by the investigator.

## **3. RESULT:**

### ***Validity of questionnaire***

The initial draft of the questionnaire had undergone number of modifications in terms of identification of categories for each group (particularly for section C), language & format of questions, specificity of questions included, total no. of questions, presentation format of questionnaire and scoring pattern. Little modifications were made in the sequencing of the questions in the questionnaire. A final draft of the questionnaire was made by incorporating the suggestions & views of the expert panel. After the final content validity from the panel experts the final draft of the questionnaire was constructed in English & Hindi languages.

The post-administration of the questionnaire on subjects in pilot study revealed that the subjects found the items/ questions included in the questionnaire helpful and easy to understand. Thus, the questionnaire was found valid for the application for the present study.

### ***Reliability of questionnaire***

In the reliability check with test re-test method, the questionnaire provided similar results on its repeated administration. And with Karl Pearson's correlation formula, coefficient correlation was found to be  $r = 0.84$ . Thus, the questionnaire was found and ensured to be reliable for the study purpose.

### ***Feasibility of questionnaire***

The administered questionnaire was found easy to understand by the subjects. The average time taken for the administration of the questionnaire was approx. 15 – 20 minutes per person. Thus it was found feasible to apply for the main study.

## **4. DISCUSSION:**

In the present study, special attention was given for devising the questionnaire that could be easily completed by parents of the study area and a holistic approach was kept in mind for nutritional knowledge section. The problems



in understanding & assessing the multi-dimensional concept like nutritional knowledge may be particularly hard for parents of preschool aged children, where not only food habits differ, but the rapid changes in food behavior of preschool aged children, children's high vulnerability for nutritional issues, varied educational levels of parents, parental occupation, varied economic status and conceptual nutritional knowledge & skills and ability to understand nutritional concepts, may all vary considerably.

This paper reports the development of a questionnaire (interview schedule) which included 3 sections namely section A, B, C i.e. general information, socio-demographic profile, knowledge of parents, respectively, in whole. The questionnaire can be used for the assessment of nutritional knowledge of parents in holistic manner. The participation of the specialists & experts working in research, paediatrics, nutrition and public health empanelled for the present study was crucial & decisive to address the issues that reflected the expected responses of participants in section A, B & C of the questionnaire, especially in section C of the questionnaire which was specifically for nutritional knowledge of parents. The adequacy of questionnaire for application during the pilot study suggests the feasibility and usefulness of it for the main study.

Table 1: Section A, B & C of designed questionnaire of interview schedule

<b>Section A</b>	
<b>Categories</b>	<b>Options</b>
Respondent's Relation to Child	Father
	Mother
Gender	Male
	Female
Date of Birth	
Food Habits	Vegetarian
	Non-vegetarian
	Eggitarian
Residential Area	Urban
	Rural
<b>Section B</b>	
Religion	Hindu
	Muslim
	Others
Father's Education	Professional Course/P.G/ Higher
	Graduate
	Intermediate (12 <sup>th</sup> )
	High school (10 <sup>th</sup> )
	Middle School Certificate (8 <sup>th</sup> )
	Primary School Certificate (5 <sup>th</sup> )
Father's Occupation	Illiterate
	Govt. Service/ Pvt. Job
	Business/ Self employed
Mother's Education	Unemployed/ House wife
	Professional Course/P.G/ Higher
	Graduate
	Intermediate (12 <sup>th</sup> )
	High school (10 <sup>th</sup> )
	Middle School Certificate (8 <sup>th</sup> )
Primary School Certificate (5 <sup>th</sup> )	
	Illiterate



Mother's Occupation	Govt. Service/ Pvt. Job
	Business/ Self employed
	Unemployed/ House wife
Monthly Family Income (in Rupees)	
Type of Family	Nuclear Family
	Joint Family
<b>Section C</b>	
<b>Categories/ Domains</b>	<b>Questions</b>
Food & Food Groups	- Food is important for health because?
	- How many food groups are there?
Nutrients, their Functions & Sources	- Chemical compounds present in food which makes the body healthy are known as ?
	- Wheat, Rice, Jowar, Jaggery etc. are rich sources of which nutrient?
	- Lentils, soybean, egg, fish, etc. are the rich sources of which nutrient?
	- Vegetable oil, ghee, nuts, etc. are rich in which nutrient?
	- Green leafy vegetables like spinach, etc. & citrus fruits like orange, etc. are rich sources of which nutrient?
	- Ragi, bajra, pomegranate, etc. are the rich sources of which nutrient?
	- Which nutrient mainly gives energy to the body?
	- Which is the body building nutrient?
	- Which nutrient provides energy, maintains body temperature & protects internal organs of body?
	- Which nutrient helps in electrolyte balance, strengthen bones, immunity, etc. in body?
	- Which nutrients help in wound healing & in making enzymes, hormones, blood etc.
	- Rich dietary sources of iron are?
	- Rich dietary sources of vitamin C are?
	- Which type of dietary fat is good for children's health?
Balanced Diet	- Balance diet is a diet which has?
	- How many nutrients are there in a balanced diet?
	- Does all major nutrients are present in milk?
Food Diversity	- Do including variety of food in diet makes child healthy?
Junk & Processed Foods	- Junk & processed foods (pizza, chips, etc.) are unhealthy for children because they are?
RDA & Dietary Consideration	- For children how much water is daily required (as per RDA)?
	- How much calories are daily required for 3 – 6 years old children (as per EAR)?
	- How much protein is daily required for 3 – 6 years old children (as per RDA)?
	- How much visible fat is daily required for 3 – 6 years old children (as per EAR)?
	- How much dietary iron is daily required for 3 – 6 years old children (as per RDA)?
	- Which of the following vitamin is required to be eaten daily as it is water soluble?



Major Nutritional Problems (Including malnutrition & anemia)	- Which of the following is caused due to eating imbalanced diet?
	- Have you recently done the assessment of your child's weight & hemoglobin?
	- Do you know the standard weight for preschooling children?
	- Do you know the standard hemoglobin cut-off for children under 6 years of age?
	- Underweight & obesity are the form of which disease?
	- Which vitamin is required for iron absorption in body?
	- Blood formation requires which of the following minerals?
	- Anemia is caused due to deficiency of which nutrient in diet?
	- Do think that tea and coffee can also cause anemia?
	- Which of the following symptoms indicate the state of underweight?
	- Which of the following are the symptoms of overweight & obesity?
	- Which of the following symptoms shows that your child is anemic?
	- What are the health risks of malnutrition in children?
	- What are the health risks of anemia in children?
- Which of the following should be eaten to prevent Malnutrition?	
- Which of the following should be eaten to prevent anemia?	

The limitation of this questionnaire is that, it is not possible to assess the nutritional practices and attitude of parents with this questionnaire, considering the focused area of study which is the designing of effective intervention module for parents, limited no. of questions to assess in each category of nutritional knowledge and the need of rapid application of the questionnaire during the surveys, for the present study. Although this strategy makes it possible to obtain information within a short period of time and the operational issues such as time required to administer the questionnaire on each parent, available time given by the school authorities for data collection, and conduction of other section of data collection i.e. assessment of nutritional status of children, should be considered so that the questionnaire administration in research does not interfere with other activities of data collection process (14).

Despite of extensive qualitative & quantitative assessments and refinement of questionnaire designing for knowledge, there are still significant problems with using questionnaires as a reliable data collection tool for knowledge assessments over time. By reflecting their own nutritional knowledge levels and making them aware of updated nutritional information, enquiring with subjects under study have the potential to change post-intervention effects and subjects' answers. However, the strategy & methodology adopted in present research should help to address this issue effectively by including parents and their preschool aged children, and by designing effective nutrition education intervention for parents. The developed questionnaire was a parent-based tool intended to increase parental nutritional awareness on child nutrition. It was created to measure the nutritional knowledge of parents of preschool-aged children (15).

We entrust that, this questionnaire can be used in both interventional and non-interventional settings and that it may be helpful for school & parents based nutrition education programmes & activities. The questionnaire is likely to reveal areas of nutritional ignorance that could help with the introduction of routine nutrition-based activities at the school and parental levels, as well as the reintroduction of updated nutritional knowledge for parents and awareness towards nutritional status of preschool-aged children. Conduction of such studies is required to assess the extent to which parents are nutritionally aware and realization of potential & scope in such areas.

## 5. RECOMMENDATIONS:

Importance of nutritional knowledge and parental participation must be realized through conduction of more such studies. Further development, validation & reliability tools such as questionnaires, is indispensable in community nutrition researches. This should include parents (mother & father), children & schools, and evaluation & comparison of questionnaire data for further development of effective interventions for enhancing nutritional status of children and parental-nutritional awareness & insight. There should be conduction of more parents & school based nutrition researches and further development of effective nutrition education interventions focused on the nutrition of developmental years of children to effectively combat with nutritional & health issues among parents & children.



## 6. CONCLUSION:

Although parents are the important factors for impacting the nutritional status of preschool aged children, their nutritional knowledge levels and parental participation have been identified as a key component in developing food-behaviours and nutritional problems in children. Nutritional researches are hindered by the lack of suitable tools with holistic approach to assess nutritional knowledge of parents intended to improve children's nutritional status. The present study provides nutritional knowledge assessment tool for parents of preschool aged children for the application at parental & school levels and for practitioners & general society, that takes into account 7 domains of nutrition, adjusted according to study locale including items evaluated & validated by group of experts from holistic, clinical, nutritional, paediatrics, public health & research perspectives directed towards preschool aged nutrition. Its application in pilot study showed its adequacy, practicability, understandability & feasibility of its use for parents, short-time for administration, economic cost & reproducibility. Therefore, the present tool is expected to effectively contribute to the academic, research, clinical and intervention development purposes aimed at preschool nutrition. The nutritional knowledge questionnaire developed in the present study is for the Indian population and is a valid & reliable assessment tool and to assess the knowledge of parents/ caregivers. It should be noted that the validity & reliability of this tool is acceptable, but should be re-validated & tested for reliability if the tool is to be used for other populations. This questionnaire can serve as the model for development of similar tools & nutrition education interventions in other population and other age groups, based on their local recommendations & specifications. For future adaptations of the questionnaire, the aspects of sustainable diets, and parental practices & attitudes could also be included, in order to study other nutritional aspects as per the design and need of study.

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