Beliefs of Medical Students in the Hot and Cold Effects of Food: Impact of Nutrition Education

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Abstract

Introduction: The theory of the hot and cold taseer (effect) of food has been practiced for many centuries. It is a belief seen in qualified doctors, homeopaths, hakims, and the common people in many parts of the world. With the taseer of food are associated many myths and fallacies. The objective of this study was to assess whether the nutrition component of medical education has any impact on the beliefs of students.

Methodology: This is a cross-sectional study. The curriculum at Ziauddin Medical University has an integrated method of teaching. The modules are taught system wise. Nutrition education is therefore part of almost all the modules and is taught from first through fourth year. All students of first and fifth year of Ziauddin Medical University (ZMU) were given a pre-tested, self-administered questionnaire. Students of first year and final year were compared. Test of difference between mean and proportion was applied and p-value determined. Correlations of gender, ethnicity and belief in the concept were determined.

Results: A total of 106 students participated in the study, 67 from first year and 39 from final year. The demographic characteristics of the two groups were similar. Ninety three percent of the first year students believed that foods have effects such as hot and cold, versus 51% students from final year ($P<0.001$). There was no significant difference in the belief of hot and cold effects of food by gender ($P=0.13$). First year students defined hot foods as those causing pimples, early maturity in girls, allergies, difficulty in digestion, increased blood pressure, diarrhea and a feeling of heaviness. The final year students defined hot foods as those that caused pimples, early maturity in girls and were difficult to digest. Both groups defined cold foods as those that cause cough/cold and sore throat. In addition, the first year students thought that cold food causes chest congestion.

Conclusion: Myths and misconceptions about food are widely prevalent in the subcontinent. From the present sample, it can be concluded that the change in belief may be attributed to the knowledge gained by studying nutrition in the curriculum. Changing the traditional belief system of any society is difficult. This study indicates that nutrition education may have such an effect. Hence it is necessary that the health professionals be trained in sound knowledge of the principles of nutrition (JPMA 53:229;2003).

Introduction

The theory of 'hot and cold effects of food' has prevailed in our culture since time immemorial. It is a system parallel to modern biomedical sciences. Generally speaking, it has been observed in our society that the theory of hot and cold is believed-in and practiced-by almost all sectors of society. It is not a concept solely seen in the less educated class, nor does it only belong to the lay people. From qualified doctors, homeopaths, hakims, to the general masses all have some faith and belief in the hot and cold effects of foods.

This theory is prevalent in almost all parts of the world, irrespective of religion and political ideology. It has deep roots in the Indian, Malay, Korean, Sinhalese and Mexican cultures and is found in varying degrees in the Latin American, North American, European and African countries as well.[1] The difference lies in the perception and interpretation of this theory, which varies with different cultures and even within the same culture. Some cultures use this theory to define foods and its effects, while in others it is also used to classify herbs, medicines, illnesses and diseases, etc. The roots of this theory emerge from the Spanish humoral medicine. As early as the 5th century BC there is reference to the hot-cold aspect of humoral medicine in the works of Hippocrates.[2] In the Indian Ayurvedic belief this concept appears as early as the 2nd century BC.[2] In the Chinese culture the Ch'i concept (Yin-cold and wet; yang-hot and dry) appeared in the 100-200 AD.[2]

In the more developed countries one finds that the modern biomedical paradigm tends to disregard this theory altogether, stating it to be 'too variable and inconsistent'. On the contrary in countries of the East including Pakistan one finds that even medical practitioners have a firm belief in the effects of food on the body. In their practice they restrict foods in all illnesses ranging from the common cold to cirrhosis. The point needs to be made that variability; disagreement and inconsistencies are not evidence enough to prove that a system is moribund.[1] It does suggest however, that the system is less organized and may lead to the outgrowth of many myths and fallacies about the effects of food. The consequences of such myths can be overwhelming, as is many times observed and reported.

The present study is a quantitative analysis focused on the medical students. The objective is to assess whether medical education has any impact on the beliefs of students. The researchers hypothesized that since the medical curriculum at Ziauddin Medical University (ZMU) had a component of nutrition it should help students to clear their concepts of this theory of 'taseer of food' and the myths surrounding it. Hence a final year student would have less belief in it, versus a first year student.

Methodology

Medical Curriculum of Ziauddin Medical University, Nutrition Component

The Ziauddin Medical Universaity is a private medical university, in Karachi, Pakistan. The under-graduate programme of the Ziauddin Medical University is community oriented, has horizontal integration and a problem-solving approach. The modules are taught system wise. Nutrition education is therefore part of almost all the modules and is taught from first through fourth year.

In the pre-clinical years (first and second year), nutritional management or prevention is integrated into the system. For example with the cardiovascular system, students would study the role of diet and lifestyle modification in the management of a patient with CVD, as well as the principles for primary prevention. In the third year students apply their existing knowledge when they go for their clinical rotation to a primary health care center set up by ZMU, in a near by squatter settlement.[3] Here they also learn to assess the nutritional status of and counseling of children and women.

In the fourth year the curriculum has a special time allocation for nutrition. Students through case-based discussions cover the areas of nutritional assessment and counseling, balanced diet, micro and macro nutrient deficiencies, diet for various physiologically stressed stages of life, as well as diet in and prevention of certain diseased conditions. Students apply their knowledge into practice on the field and home visits that they are required to do.[4]

All students of first and fifth year of Ziauddin Medical University (ZMU) were given a pre-tested self-administered questionnaire. They were asked to fill out the form and return them within a week. Students who did not return the form after one week were given personal reminders by the research team. Informed consent was taken from the students for publishing the results as group data.

Study Design

This is a cross-sectional study. Two groups of students are compared. One group being at the beginning of their medical training, the other at the end. All students were from ZMU, no other institute was selected in order to prevent bias due to difference in the medical curriculum and selection criteria of admission.

The sample size was calculated on Epi info 2000. Assuming that about 80% students of 1st year believe in this theory, at a 0.05%, to detect a difference of 30%, we need a sample size of 45 students in each group. Since the final year students are less in number a 2:1 unmatched sample has been selected. Therefore we needed 66 students from first year and 33 from the final year.

Test of difference between mean and proportion has been applied where appropriate and p-value has been determined. Correlations of gender, ethnicity and belief in the concept have been determined.

Results

In all there were 109 students eligible for the study. A total of 106 students participated in the study. All 67 students from first year participated and were assigned group A and 39 out of 42 (93%) students from final year participated and were assigned group B. Table 1 gives some basic characteristics of the 2 groups. The majority of the students in both the groups were Urdu speaking, followed by Punjabis. The remaining were Pushto speaking, Sindhi, Memons, etc. In group A (first year) 93% students believed that foods have effects such as hot and cold, versus only 51% in group B (final year) ($P<0.001$). There was no significant difference in the belief of hot and cold effects of food by gender ($P=0.13$).

Table 1. Comparison of the demographic characteristics.

	1st Year	Final Year
Age (years) (mean, SD)*	18.2 ± 0.9	22.3 ± 0.9
Males (%)	30	33
Females (%)	70	67
Urdu speaking (%)	46	54
Punjabi (%)	16	18

* = $P < 0.05$

Group A defined 'Hot Foods' as those causing pimples (89%), early maturity in girls (63%), allergies (47%), are difficult to digest (42%), increase blood pressure (37%), cause diarrhea (32%) and cause a feeling of heaviness (26%). The major items of hot foods include beef, mutton, chicken, fish, organ meat, egg, coffee, tea, dates, dry fruits, honey, mangoes, ginger, garlic, fried foods, oil, butter, ghee, bitter gourd, spicy foods, soup/broth. Group B defined 'Hot Foods' as those that cause pimples (85%), early

Table 2. Comparison of Beliefs of Foods to be Restricted and Preferred in Different Disease Conditions

Disease condition	Food Items	First Year (%)	Final Year (%)
Cough/Cold = Restrict	Ice cream	38	84
	Orange	63	09
	Yogurt	25	25
	Cold water and ice	25	20
Cough/Cold = Prefer	Egg	25	18
	Tea	00	25
	Yakhni / soup	13	47
Diarrhoeal diseases = Restrict	Dal/pulses/beans	25	09
	Spicy foods	13	20
Diarrhoeal diseases = Prefer	Banana	25	20
	Rice	25	20
	Yogurt	25	11
Liver diseases = Restrict	Fried foods	25	00
	Oil	38	04
	Spicy foods	00	18
Liver diseases = Prefer	Liquids/juices	00	20
Pregnancy = Prefer	Milk	50	16
	Oil	25	00
	Rice	25	00
	Fruits	38	04
Lactation = Prefer	Milk	50	16
	Fruits	25	02
Summer = Restrict	Coffee	38	11
	Egg	25	16
Winter = Restrict	Ice cream	25	56

maturity in girls (25%) and are difficult to digest (25%). The foods that were listed as hot foods were similar to that of group A except that oil, ghee, butter and fried foods were labeled as inert. Vegetables were categorized as inert (ginger, garlic and bitter gourd).

Both groups A and B defined 'Cold Foods' as those that cause cough/cold (82%, 56%) and sore throat (61%, 55%), respectively. In addition, group A also thought that they caused chest congestion (63%) and were easy to digest (29%). Banana, orange, pomegranate and ice cream were thought to be cold by both groups. Group A classified almost all fruits and vegetables as cold, while group B classified them as inert. Inert foods include jamun, melon/watermelon, sugarcane, papaya, raddish, tomato, pumkin, tinda, turai, spinach and other green leafy vegetables, glucose and milk. Rice was the only food item that group A classified as baadi (causing flatulence), while group B classified as cold.

'Baadi foods' were defined as those that cause gas, by both groups (94%, 65%). Both the groups categorized cabbage as baadi. Group A also classified rice and fried foods as baadi.

Both groups were asked about foods to restrict and prefer in certain conditions-diseased or otherwise. In group A 73% students felt that in certain conditions food should be restricted, while in group B only 40% thought so ($P<0.01$). Table 2 gives a list of the major food items that the students thought should be restricted or preferred during certain conditions.

Discussion

Myths and misconceptions about food, are widely prevalent in Pakistan.[5] Invariably patients ask the attending physician regarding 'perhaiz' or particular food restrictions during episode of illness. Ironically, nutrition is not included in the undergraduate medical curriculum of Pakistan except in a few medical universities.[6] Thus much of dietary advice given by physicians is based on their own perceptions rather than on any scientific evidence, this further reinforces cultural beliefs pertaining to perhaiz.

This study has shown that 93% of the students beginning the medical school had a strong belief in hot and cold food, while 51% of students who were exposed to nutritional curriculum did so. Although the study was a cross sectional comparison between two different groups, the researchers believe that the students in both the groups come from the same background, as is also shown by the comparable demographic characteristics. Hence, it can be concluded that the change in belief may be attributed to the knowledge gained by studying nutrition in the curriculum. The change in belief was observed in 41% of students ($P<0.001$). It can also be argued that almost 50% of the students who were exposed to the nutritional curriculum still retained their myths and misconceptions. Perhaps more in-depth study of the principles of nutrition is required. The curriculum at ZMU is still being fine-tuned and further strengthened. Another basic reason is that it is a difficult and long process to change century old cultural beliefs. It would not be incorrect to assume that students of group A, when they complete their medical education, would have more clearer concepts of nutrition and less myths as they have been exposed to more of nutrition study.

Interestingly, both groups of students categorized meat, tea, coffee and calorie-dense items like dates mangoes, dry fruits and honey as `hot'. While, oil, ghee, butter which are also calorie-dense were categorized as `hot' by group A and as `inert' by group B. Similar is the case in other Asian populations.[2,6] Majority of the final year students (85%) believed that hot foods caused pimples.[2,7]

While first year students classified most fruits and vegetables as cold, the final year students did not. They believed that fruits and vegetables were mostly inert and had no hot or cold effects on the body. The general beliefs of the first years are those reflected by many cultures.[1,2,7-10]

It is also important to note that perception about food items to be preferred or restricted in particular disease conditions is not desirable in both groups, for example restriction of yogurt in cough and cold, by both groups. It was surprising to note that in pregnancy and lactation, there were no preferred food items, in spite of the fact that this area is part of their curriculum. This warrants an in-depth study of students' knowledge and beliefs regarding dietary needs during pregnancy and lactation.

Changing traditional belief system of a society is a daunting task. Teasing out the myths from the truth and backing it up with scientific evidence is also quite difficult. Yet none of it is impossible. The starting point in educating the masses has to be in training and educating the health professionals, including doctors, nurses, hakims, homeopaths, etc. Patient education is an important task, which the doctors need to perform.[11] This requires that the health professionals be trained to acquire sound knowledge of the principles of nutrition.[12]

In the West medical institutions have realized the importance of nutrition in the medical curriculum[13-17] and have made necessary provisions for giving nutrition appropriate number of teaching hours.[13,15,17,18-20] Unfortunately nutrition has not got the required attention and therefore only a few medical colleges in Pakistan provide nutrition education. Hence it is recommended that nutrition should be made an integral part of the curriculum of all medical institutes.

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