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ORIGINAL CONTRIBUTION

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A comparison of dietary reference values for energy of different countries

Richtwerte für die Energiezufuhr verschiedener Länder im Vergleich

Abstract Dietary reference values for food energy for population groups are set at the level of average energy requirement without a safety margin to avoid any risk of inadequate energy intake. Average energy requirements and hence reference values for energy can be determined from either energy intake data or energy expenditure. In this article, the present reference values for energy of 12 countries, the FAO/WHO/UNU and the Scientific Committee on Food (SCF/EC) are compared regarding the level of their standards and underlying concepts. Methods for estimating energy requirements of different population groups and data sources for reference values for energy are summarized. Furthermore, reference values for energy for males and females of all ages are presented in separate graphs. The comparison of national standards illustrates that the level of reference values for energy for individual countries is dependent on variables such as methodology, data sources, allowances for physical activity, reference body weight, and age range. Standards for adolescents and elderly persons reveal that differences in reference values are most apparent in population groups for which only limited data on energy requirements are available. Although it is not possible to evaluate the adequacy of reference values for energy by comparing data of different countries, many differences in the level of reference values can be explained on the basis of underlying concepts.

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Zusammenfassung Richtwerte zur Zufuhr an Energie für Bevölkerungsgruppen werden in Höhe des durchschnittlichen Energiebedarfs ohne Sicherheitszuschläge festgelegt. Dadurch soll das Risiko einer unangemessenen Energiezufuhr minimiert werden. Der durchschnittliche Energiebedarf und somit die Richtwerte zur Energiezufuhr können über Daten zur Energiezufuhr oder über die Bestimmung des Energieverbrauchs ermittelt werden. Im vorliegenden Artikel werden die aktuellen Richtwerte zur Energiezufuhr von insgesamt 12 Ländern, der FAO/WHO/UNU und dem wissenschaftlichen Lebensmittelausschuß der Europäischen Union (SCF/EC) hinsichtlich ihrer Höhe und zugrunde liegenden Konzepten gegenübergestellt. Die Methoden zur Schätzung des Energiebedarfs für unterschiedliche Bevölkerungsgruppen und die Datenbasis für die Richtwerte zur Energiezufuhr werden zusammengefaßt. Darüber hinaus werden die Richtwerte zur wünschenswerten Zufuhr an Energie für Frauen und Männer aller Altersstufen graphisch dargestellt. Der Vergleich der nationalen Richtwerte zur Energiezufuhr verdeutlicht, daß die Höhe abhängig ist von Faktoren wie der methodischen Vorgehensweise, der Datengrundlage, dem verwendeten Referenzkörpergewicht, der Intensität der körperlichen Aktivität und der Alterseinteilung. Richtwerte für Jugendliche und ältere Menschen zeigen, daß Unterschiede in der Höhe der Richtwerte sich am deutlichsten bei Bevölkerungsgruppen darstellen, für welche nur unzurei-

chendes Datenmaterial zum Energiebedarf verfügbar ist. Obwohl es nicht möglich ist, die Angemessenheit von Richtwerten zur wünschenswerten Energiezufuhr anhand eines Vergleichs der Daten unterschiedlicher Länder zu beurteilen, können Unterschiede in der Höhe der Richtwerte auf der Basis der zugrunde liegenden Konzepte erklärt werden.

Key words Dietary reference values – energy requirement – energy intake – recommended energy allowances – physical activity level

Schlüsselwörter Richtwerte zur Energiezufuhr – Energiebedarf – empfohlene Energiezufuhr – Aktivitätsstufe – Grundumsatz

Introduction

The energy requirement is, as defined by the FAO/WHO/UNU, the level of energy intake from food that will balance energy expenditure when the individual has a body size and composition, and level of physical activity, consistent with long-term good health, and which will allow for the maintenance of economically necessary and socially desirable physical activity (4). The energy requirement of individuals is highly variable within a population group and dependent not only on age and sex but also on factors like level of physical activity, body composition, and body weight. When setting reference values for energy intake it has to be considered that under normal conditions energy intake should balance energy expenditure and that any change in body weight is not desirable. For this reason reference values for energy intake are, in contrast to reference values for nutrient intake, set at the level of average requirement within a population group without a safety factor to account for interindividual variation. This is to avoid the risk of inadequate energy intake and hence any change in body weight and body composition (4).

Among individual countries there are differences between the national concepts related to recommendations on energy intake as well as the level of estimated energy requirements. Differences also become apparent when looking at the various terms which are used by national committees to describe reference values for energy: average energy requirement (Canada), estimated average requirements for energy (UK), recommended energy intakes (Australia), or reference values for the intake of energy (Nordic Countries) (1, 6, 8, 11, 12).

In the following paper dietary reference values for energy of different countries are compared, regarding the level of their standards and underlying concepts. Data of 12 countries, the FAO/WHO/UNU-report 1985 and the report of the Scientific Committee for Food (SCF) of the European Community (1992) are considered in this article. It should be noted that the countries were selected by availability of data and that the tables and figures given in this article are limited by availability of information. For France, New Zealand, Japan, and the Philippines the material was restricted to the reference values and therefore findings within these countries cannot be evaluated in detail.

Methods

Methods for estimating energy requirements

The energy requirement is usually determined by energy expenditure which is composed of basal metabolic rate, energy expenditure for physical activity and thermic effect of food (4). To determine total energy expenditure (TEE) a model is used which allows the energy requirement to be calculated on the basis of basal metabolic rate. Energy requirements for other components of TEE, mainly for physical activity, are expressed as multiples of basal metabolic rate. As the thermic effect of food is normally included in any estimation of energy expenditure, it is not assessed seperately (1). This factorial approach is widely used to estimate the energy requirements of adolescents and adults. In France and Germany absolute increments are given to basal metabolic rate (BMR) to account for physical activity (2, 3). In contrast to the factorial method, energy requirements of infants and children are widely calculated on the basis of energy intake data rather than on estimates of energy expenditure (4).

Regression equations for calculating basal energy requirement of different population groups have been developed by a working group of the FAO/WHO/UNU and by Schofield (4, 13). The equations are based on calorimetric measurement data which have been compiled by SCHOFIELD and include data from 11 000 measurements of healthy individuals of different age, sex, and weight (13). Table 1 summarizes the equations derived by the FAO/WHO/UNU expert group. Because the data base has been slightly expanded since the FAO/WHO/UNU-report was compiled, the Schofield equations show some minor but negligible differences (4).

Table 1 Equations for predicting basal metabolic rate from body weight (W)

Age range (years)	kcal/day	Correlation coefficient	MJ/day	Correlation coefficient
Males				
0 – 3	60.9 W - 54	0.97	0.255 W - 0.226	0.97
3 – 10	22.7 W + 495	0.86	0.0949 W + 2.07	0.86
10 – 18	17.5 W + 651	0.90	0.0732 W + 2.72	0.90
18 – 30	15.3 W + 679	0.65	0.0640 W + 2.84	0.65
30 – 60	11.6 W + 879	0.60	0.0485 W + 3.67	0.60
> 60	13.5 W + 478	0.79	0.0565 W + 2.04	0.79
Females				
0 – 3	61.0 W - 51	0.97	0.255 W - 0.214	0.97
3 – 10	22.5 W + 499	0.85	0.0941 W + 2.09	0.85
10 – 18	12.2 W + 746	0.75	0.0510 W + 3.12	0.75
18 – 30	14.7 W + 496	0.72	0.0615 W + 2.08	0.72
30 – 60	8.7 W + 829	0.70	0.0364 W + 3.47	0.70
> 60	10.5 W + 596	0.74	0.0439 W + 2.49	0.74

(modified from FAO/WHO/UNU 1985, p 71)

Equations of Schofield respectively the FAO/WHO/UNU are used in the USA, Canada, the Netherlands, France, the Nordic Countries and partly by the SCF of the European Community. The Committee on Medical Aspects of Food Policy (COMA) in the UK developed equations which are based on additional data but differ only slightly from equations in Table 1 (1). In Germany, basal metabolic rate is calculated from equations of HARRIS and BENEDICT from 1919 (2).

When using Schofield's or FAO/WHO/UNU equations to calculate basal metabolic rate, it has to be considered that body weight is used as a variable. From that it can easily be seen that the level of BMR and, therefore, the estimated energy requirement will depend on the reference body weight. The majority of countries which are included in this article set the reference body weight for adults at a level of a desirable body mass index (BMI) of 20–25 (Table 2). In the USA and the UK the average of the actual body weight is used as reference weight (1, 9). In the SCF-report both desirable body mass index (BMI) of 22 and the average of the actual body weight were used as reference weights of European men and women derived from more recent studies in ten European countries (14). Information on standards for body weights were not available for all countries.

Table 2 Reference body weights for calculating basal metabolic rate of adults[1)]

Country	Reference Body Weight
Australia	BMI 22.5
Canada	BMI 23.18–25.26 (Males)*
	BMI 22.66–26.64 (Females)*
Germany	BMI 24 (Males)
	BMI 22 (Females)
Nordic countries	BMI 20–25
The Netherlands	Average of BMI 20–25
United Kingdom	observed body weights
USA	observed body weights

1) Both desirable body mass index (BMI) of 22 and the average of the actual body weight of European men and women were used in the SCF-report (Table 2.1 to 2.4, Reference 14)

* BMI dependent on age. Values are taken from Table 5 (Reference 6). For additional PAL the mid-point (BMI 22.5) in the range of desirable weights is used.

Each physical activity level (PAL = total energy requirement per day/basal metabolic rate per day) is characterized by a certain level of energy expenditure. To determine total energy requirement by the factorial approach, reliable data on characteristic activity patterns of the different age groups must be available. The average daily energy requirement can be calculated by using tables in which energy requirement for different activities is expressed as multiples of basal metabolic rate. Such tables have been developed by the FAO/WHO/UNU working group (4). From the time spent at each activity an average daily energy requirement can be calculated according to the assumed activity pattern.

Methodology and data sources for setting dietary reference values for energy

Adults

The difficulty in setting reference values which account for the lifestyle of a population is the availability of reliable data on characteristic activity pattern of different

Table 3 Physical activity levels (PAL)[1] for adults, age 20–59 years

Activity Level	FAO/WHO/ UNU	USA	Canada	Aus- tralia	Nordic Countries	EU[2]	UK[2]
Males							
Very light	–	1.3	–	–	1.4	–	–
Light/Low	1.55	1.6	1.55	1.5	1.6	1.41	1.4
Moderate	1.78	1.7	1.78	1.8	1.8	1.70	1.6
High/Heavy	2.10	2.1	2.10	2.1	2.0	2.01	1.7
Very high	–	2.4	–	–	2.2	–	–
Females							
Very light	–	1.3	–	–	1.4	–	–
Light/Low	1.56	1.5	1.56	1.5	1.5	1.42	1.4
Moderate	1.64	1.6	1.64	1.7	1.8	1.56	1.5
High/Heavy	1.82	1.9	1.82	1.8	2.0	1.73	1.5
Very high	–	2.2	–	–	2.2	–	–

[1] PAL = Total energy required per day/basal metabolic rate per day
[2] PAL for passive non-occupational activity. (Additional factors for moderate, and very active non-occupational activities are given in references 1 and 14)

age and sex groups. Because there is a great variation in physical activity within a group of people, most countries have estimated energy requirements for men and women of various ages and at different physical activity levels to give reasonable reference values for all population groups. The working group of the FAO/WHO/UNU, the SCF, and the UK derived reference values for energy for male and female adults of different body weights and at different levels of physical activity (1, 4, 8, 14).

Reference values for energy intake at different PAL are defined in categories of light/low, moderate and heavy/high physical activity. In some countries, additional categories for very light and/or very heavy activity are considered. Table 3 summarizes the PAL for men and women in different countries. From Table 3 it can be seen that within the same category the physical activity pattern is set at different levels. This has to be considered when comparing reference values for energy of different countries within single categories.

Infants, children, and adolescents

Energy requirements for infants were derived in 1985 by the FAO/WHO/UNU expert group from energy intake data of a total of 4,000 breast-fed and bottle-fed infants in Canada, Sweden, the UK, and the USA (15, 4). Average values for each age were increased by 5 % to allow for a perceived underestimate of intakes. In addition, the UK evaluated additional material on energy intake in infants from different sources in its 1991 report (1). Results of observed intake data from 1,500 modern formula fed infants in Australia, Canada, France, the Netherlands, Sweden, and the UK were taken as a data base for reference values. By combining evidence from all sources, the British committee derived reference values for energy intake which were found to be in agreement with the FAO/WHO/UNU-values without an increment (1). The reference values for children under the age of 3 years were based on the same data sources.

Because data on both the time and cost of the various types of physical activity are lacking, estimates of energy requirement for children are based on energy intake data (4). The FAO/WHO/UNU working group derived values from studies in developed countries and more affluent groups of developing countries. The values were increased by 5 % to cover energy needs for a desired physical activity. In contrast, the British committee found that higher reference values would not necessarily lead to an increase in physical activity among children and, therefore, adopted the FAO/WHO/UNU-values without additional increments (1).

The average energy intake values of the FAO/WHO/UNU working group formed the basis for reference values in Germany and the USA, while the proposed reference values of the SCF were considering primary data sources from nine European countries (2, 9, 14) and oriented on the British standards. Different studies on energy intake data have been used in Canada and the Nordic Countries (5, 11). Unlike in other countries the factorial approach was used in the Netherlands to derive energy reference values for infants and younger children (10). To determine basal metabolic rate, Schofield's equations were used. No information is given about the assumed physical activity level.

Following the reference values for energy intake of adults, energy requirements for adolescents are primarily

estimated by the factorial approach. Apart from requirements for physical activity allowances for growth must be made. The PAL of the USA, the UK, Australia, the FAO/WHO/UNU working group, and the SCF are in the range of 1.5–1.7 x BMR for male and 1.48–1.67 x BMR for female adolescents from 10–17 years (1, 4, 8, 9, 14). The German committee on nutrient requirements also derived the energy requirements for older children and adolescents by using the factorial method but no PAL is stated in the report (2).

Elderly people

At present there is little accurate data on the energy requirements of elderly people. The FAO/WHO/UNU working group refers to the fact that changes in energy expenditure occur with increasing age (4). In the expert group's view this is caused by a decline in BMR referring to body weight which relates particularly to the fall in lean body mass (LBM). At the same time a reduction of energy expenditure due to a decline in physical activity has to be taken into account. Due to insufficient data on changes in the physiological energy requirement with age, the FAO/WHO/UNU group and most countries had to use the limited data from Schofield as a basis for their reference values for energy of elderly subjects.

Special consideration to the energy needs of people over the age of 60 was given by the COMA in the United Kingdom which included additional studies on daily energy intakes of elderly people in its latest report on dietary reference values (1). Energy intake data from 101 males at the age of 60–70 years in the UK as well as unpublished data from 350 males and females in Italy were evaluated. Measurement data from tropical countries of Schofield's data base were excluded. Based on this data base, COMA designed equations for calculating basal metabolic rate of the elderly and accepted a standard value for PAL of 1.5 x BMR for non-occupied elderly over 60 years who are involved in daily household activities. For more active individuals, a higher PAL of 1.62 x BMR might be considered (7). At the same time the panel refered to the fact that more information on the variation of energy expenditure in the elderly in the UK is required. Corresponding to the British panel, the National Research Council of the USA accepted a value of 1.5 x BMR as an appropriate level of energy expenditure in the elderly (9).

Dietary reference values for energy intake

Figs. 1–4 show the standard reference values for energy of 8 countries for males and females. Figs. 1 and 2 represent values from European member states, reference values of the remaining countries are illustrated in Figs. 3 and 4. Unlike these countries, the FAO/WHO/UNU and the SCF did not define average energy requirements for adults. Values for energy requirements are given for different reference body weights and different levels of physical activity (4, 14). Therefore, standards of these organizations are not included in the graphs of this article. As ranges of desirable energy intakes are given for Australians of different body weights and heights, these data are also not included in Figs. 3 and 4 (8).

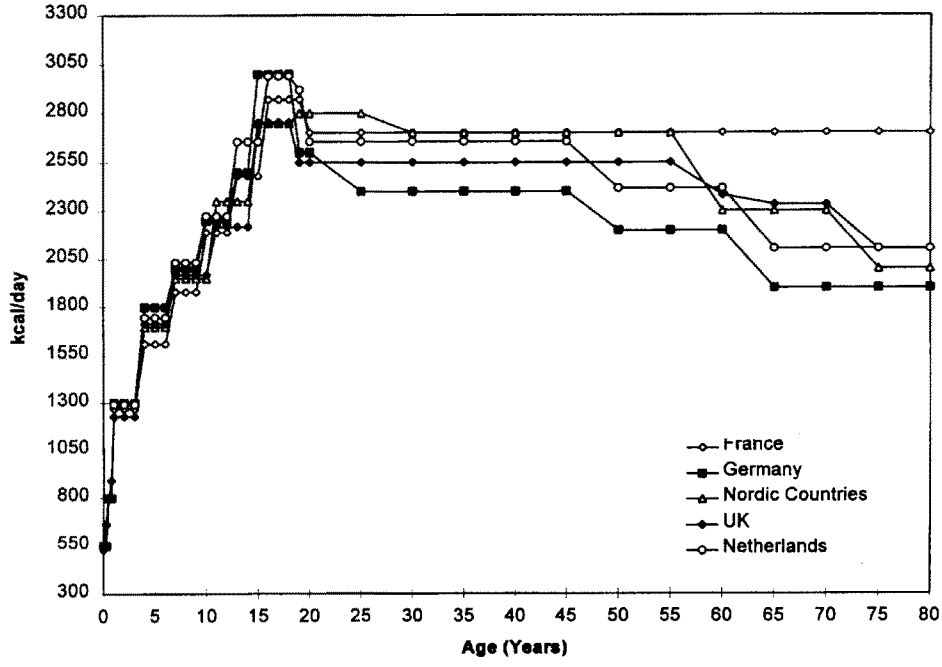

Fig. 1 Dietary reference values for energy intake, males (European countries)

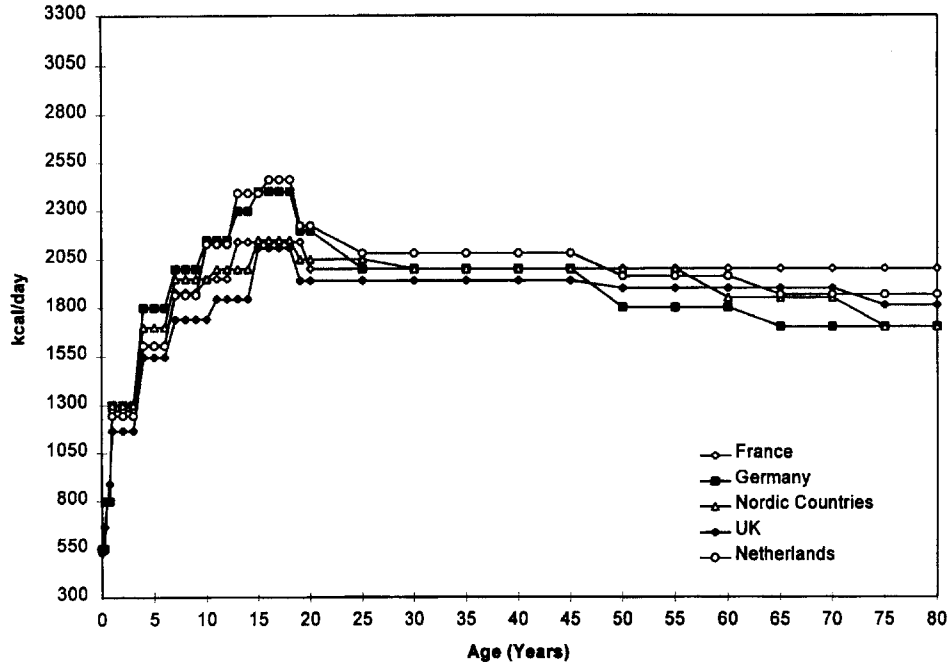

Fig. 2 Dietary reference values for energy intake, females (European countries)

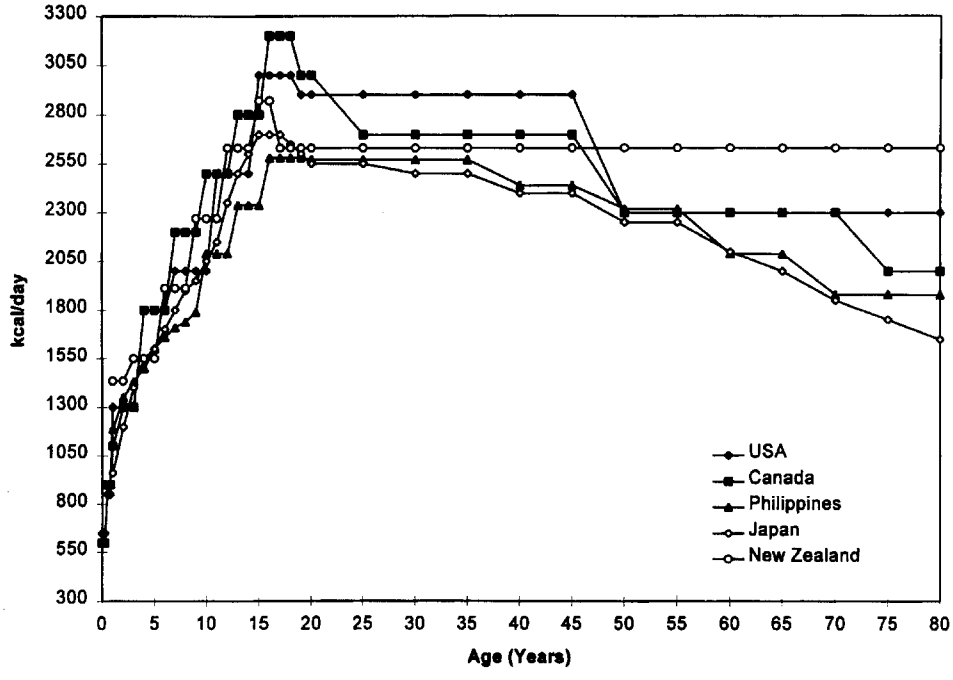

Fig. 3 Dietary reference values for energy intake, males (non-European countries)

Results

The primary expression of reference values for energy intake in infants is in kcal per kilogram body weight. Therefore, not all countries could be considered in the figures. Whereas reference values for infants of different countries are fairly close to each other, values for children from 1 year onwards show increasing differences. For example, average energy intakes are 1,450 kcal/day for New Zealand boys and girls in the age of 1–3 years. In contrast, mean energy intakes for Japanese infants of the same age group amount to 1,186 kcal/day for boys and 1,136 kcal/day for girls, yielding differences of 249 and 299 kcal/day, respectively. In general, the differences are smaller for boys than for girls. This is illustrated in Fig. 2 when looking at the comparatively low reference values for girls in the UK. Reference values for children in

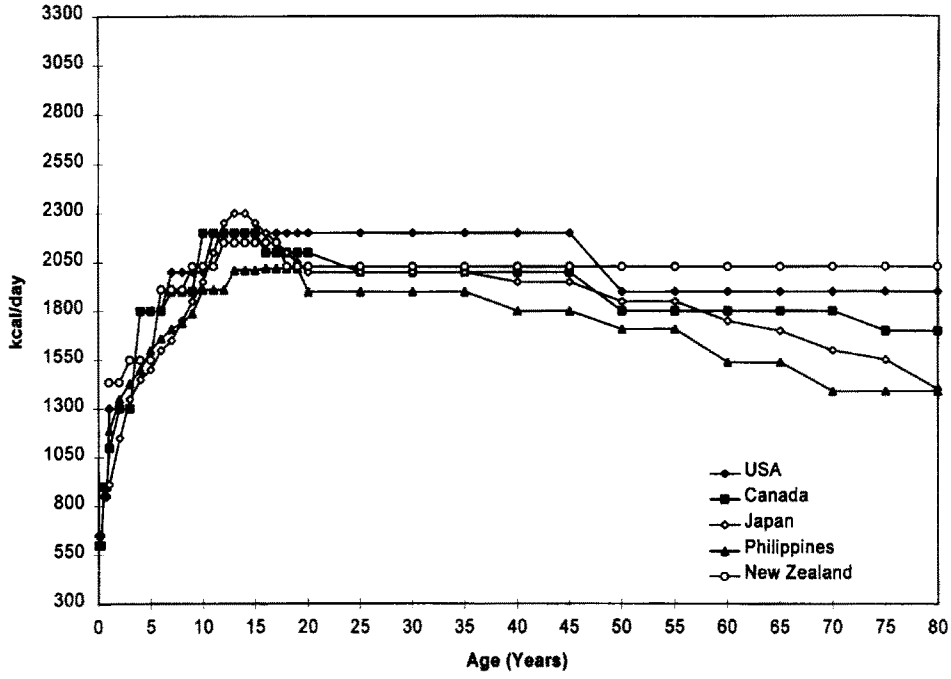

Fig. 4 Dietary reference values for energy intake, females (non-European countries)

Japan and the Philippines are lower than values set by western countries, a finding which will become more visible in the following age groups, particularly for Filipinos.

A comparison of reference values for energy intake in 10–17 year old boys and girls illustrates the increasing differences in the level of reference values between individual countries. Canadian recommendations for 16–18 year old male adolescents are 3,200 kcal/d and, thus, 450 kcal/day higher than corresponding recommended intakes in Nordic Countries (2,750 kcal/d) and the UK (2,755 kcal/d). For female adolescents, recommended energy intakes in Germany and the Netherlands are fixed at a higher level than those in other countries. A remarkable point is the high recommendation of the Japanese for females aged 13–15 which is fixed above the standards of all other non-European countries. It would be interesting to know on which assumptions these values are based, especially as Japanese standards for other age groups tend to be at rather a low level.

Reference values for energy intake in adults do not only show differences in the level but also in age grouping. US-American reference values for adults up to the age of 50 are at a higher level than in all other countries. German recommendations for males are comparably low and the maximum difference to US-recommendations for the same population group is 500 kcal/day (2,400 kcal/d vs. 2,900 kcal/d, age group 25–50 years). Generally differences are less distinct for females of the same age group. Leaving the values for the USA and the Philippines aside, the maximum difference is 100 kcal/day between individual countries. Most countries lower their reference values for people over the age of 50. Comparatively high levels are found with increasing age for France and New Zealand. The Japanese and Philippino recommendations for energy intake in adults show a

Table 4 PAL of standard reference values for energy, adults

Country	Category of activity level	PAL (Males)	PAL (Females)
Australia	light	1.4–1.6	1.4–1.6
Canada	light	–	–
France	activité habituelle	–	–
Germany	light	–	–
Japan	moderate	–	–
New Zealand	normal	–	–
Nordic Countries	low	1.6	1.5
The Netherlands	low	–	–
United Kingdom	non active life style	1.4	1.4
USA	light to moderate	1.5–1.67	1.5–1.6

steady decrease for elderly subjects and differ considerably from standards in western countries.

Although most countries have estimated standard reference values for adolescents and adults by the factorial approach, they give no clear definition of the assumed physical activity level. The PAL is often described in terms of light or moderate activity rather than in terms of multiples of BMR. The available information on PAL of different countries is given in Table 4.

Discussion

The influence of body weight and age ranges on the level of reference values for energy intake becomes apparent when looking at the difference between German and US-American standards for infants and children, which were based on the same data source. The UK as well as Japan and the Philippines distinguish between reference values for boys and girls even for very young children. This may partly account for lower reference values for girls in these countries. The use of different data sources for energy requirements for infants and children in the Nordic countries, Canada, and the Netherlands are reflected by the level of reference values. It is not clear whether these findings reflect national differences in physical activity patterns of children. A comparison of reference values for adolescents reveals that differences in the level become especially apparent for age groups for which less safe data on energy requirement are available. Not much is known about the activity pattern of adolescents. Moreover, the onset of growth spurts is highly variable and therefore the chronological age is a rather poor indicator for energy requirement. This accounts the differences in reference values of different countries for 10–17 year old adolescents, which in some cases are quite considerable.

Assuming that the factorial approach is used to derive energy requirements for adolescents and adults and that the same equations are used to calculate basal metabolic rate, it becomes apparent that body weight and PAL are decisive for differences in the level of national standards. For example, the assumption of a rather low level of physical activity in the UK results in comparably low British reference values for energy intake in some age groups. No consideration is given to non-occupational activities for adults in Germany and this is reflected in the low level of German reference values for male adults (see Table 3) (2).

The high level of US-American reference values of the National Research Council for 19–50 year old adults can be partly explained by the use of observed body weights for calculating energy requirements. Some of the shown differences between Germany and the UK also result from differences in the body weights. Regarding body weights, it is up to each country to choose the appropriate body weight for calculating energy requirement. Is has to be considered that estimations of energy requirements on the basis of body weights are only approximations as they do not take differences in body composition into account which will determine true requirements (4). However, at the moment this is the best available method for estimating basal metabolic rate for energy requirements in adolescents and adults.

No further age groups for adults over the age of 19 years were defined by France and New Zealand and this leads to increasingly high levels of recommendations for the elderly over 50. It is assumed that the given standards were based on energy requirements for young adults between 20–50 years. For this age group, the reference values of France and New Zealand are in the range of standards set by other countries. However, it must be taken into consideration that both countries did not define an upper age range and therefore it is not clear whether these values are applicable to persons above a certain age. Differences in the level of reference values are also a result of age grouping as standards for single age groups represent average values for individuals of different ages within the group. Average requirements will, therefore, change according to any alteration in the age range.

Conclusion

The comparison of reference values for energy intake clearly shows the influence of data sources and underlying concepts on the level of dietary standards. It also demonstrates the necessity of obtaining reliable data on energy requirements for people of all age groups. It is not possible to evaluate the adequacy of reference values on the basis of this article. To do so it would be necessary to investigate the entire material on measurement of BMR and energy intake for adequacy. Moreover, an examination would be required to ascertain how far assumed physical activity patterns are in accordance with actual energy expenditure within populations. Combining existing data in healthy adults in a meta-analysis demonstrated that less than 50 % of the individual variation in total energy expenditure can be explained by body weight and resting metabolic rate (5).

From studies, which have applied the doubly labeled water technique to assess energy requirements it is apparent that most of the differences in energy requirements between specific populations is explained by differences in either body composition or physical activity and that the factorial method is not effective for estimating energy requirements for individuals (5). Consequently, the application of new techniques allowing measurements of body composition and physical activity should be included in a re-evaluation of available tables on energy expenditure for different activities regarding under- or overestimation and actuality.

References

1. Department of Health (1991) Dietary Reference Values for Food Energy and Nutrients for the United Kingdom. Report on Health and Social Subjects No. 41. Her Majesty`s Stationery Office, London
2. Deutsche Gesellschaft für Ernährung (1991) Empfehlungen für die Nährstoffzufuhr. 5. Überarbeitung 1991. Umschau Verlag, Frankfurt/Main
3. Dupin H, Abraham J, Giachetti I (1992) Apports nutritionnels conseillés pour la population française. CNRS-CNERNA, Technique et documentation. Lavoisier, Paris
4. Food and Agriculture Organization/ World Health Organization/United Nations University (1985) Energy and Protein Requirements. Report of a Joint FAO/WHO/UNU Expert Consultation. World Health Organization Technical Report Series No. 724, Geneva
5. Goran MI, Poehlman ET, Johnson RK (1995) Energy requirements across life span: New findings based on measurement of total energy expenditure with doubly labeled water. Nutr Res 15:115–150
6. Health and Welfare Canada (1990) Nutrition Recommendations. The report of the Scientific Review Committee. Minister of Supply and Services. Canadian Publishing Centre, Ottawa
7. James WPT, Schofield EC (1990) Human Energy Requirements. Oxford University Press, Oxford
8. National Health and Medical Research Council (1992) Recommended Dietary Intakes for use in Australia. Australian Government Publishing Service, Canberra
9. National Research Council (1989) Recommended Dietary Allowances. 10th Edition. A Report of the Subcommittee on the Tenth Edition of the RDAs. Food and Nutrition Board. National Academy Press, Washington, D.C.
10. Netherlands Food and Nutrition Council (1989) Recommended dietary allowances 1989 in the Netherlands. Summary, Voedingsraad, The Hague
11. Nordisk Ministerrad, Nordic Council of Ministers (1989) Nordic nutrition recommendations. 2nd edition. Report 1989:2 (English version). Standing Nordic Committee on Food, Copenhagen
12. Nutrition Advisory Committee (1983) Recommendations for selected nutrient intake levels of New Zealanders. Hasselberg Verlag, Wellington, New Zealand
13. Schofield EC (1985) An annotated bibliography of source material for basal metabolic rate data. Hum Nutr: Clin Nutr 39 C (Suppl 1):42–91
14. Scientific Committee for Food of the European Community (SCF) (1992) Nutrient and Energy intakes for the European Community. Reports of the Scientific Committee for Food, 31st series. ECSC-EEC-EAEC Brussels, Luxemburg
15. Whitehead RG, Cole TJ (1981) A critical analysis of measured food energy intakes during infancy and early childhood in comparison with current international recommendations. J Hum Nutr 35:339–348