



CHARITÉ CAMPUS MITTE

Heilen Forschen Lehren Helfen

Ernährung 2006, Berlin 2006

Das interdisziplinäre Ernährungsteam – eine Vision ?

Johann Ockenga
Gastroenterologie, Hepatologie & Endokrinologie
Charité – Campus Mitte
Universitätsmedizin Berlin

Wer braucht Ernährungstherapie bzw. ein Ernährungsteam ?

Shang et al. Clinical Nutrition (2005) 24, 1005–1013

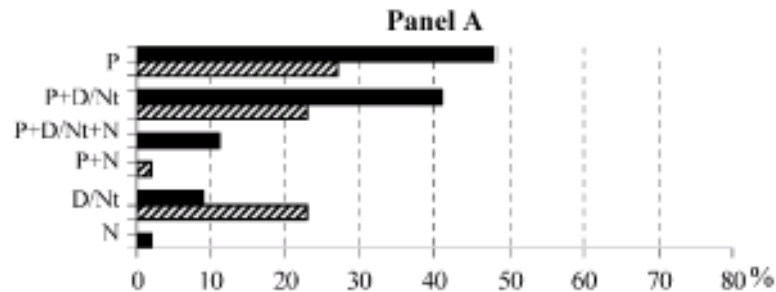
Table 2

At hospital represented specialities (%)	Speciality	Specialities where nutrition care is needed (%)
100	Surgery	97
100	Internal medicine	97
100	Anaesthesiology	84
90	ICU	84
90	Gynaecology	52
85	Oncology	83
74	ENT	82
71	Paediatrics	53
66	Neurology	72
64	Neurosurgery	70
62	Oral surgery	59
13	Geriatrics	31
13	Orthopedics	13
11	Psychiatry	30
11	Urology	26
9	Dermatology	21

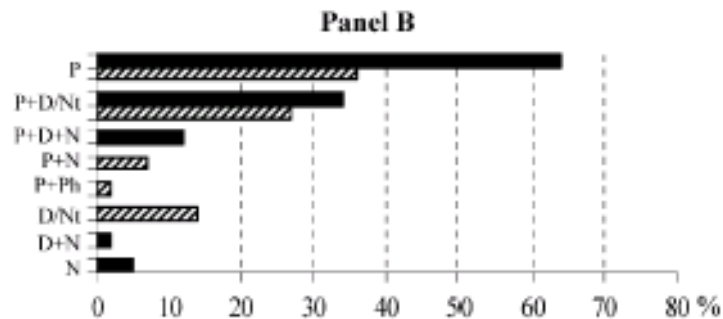
Charts of in hospital represented specialities and the need of nutrition care in these specialities. ENT = Ear Nose Throat, n = 87.

Wer ist verantwortlich für Erstellen und Monitoring von Ernährungstherapie?

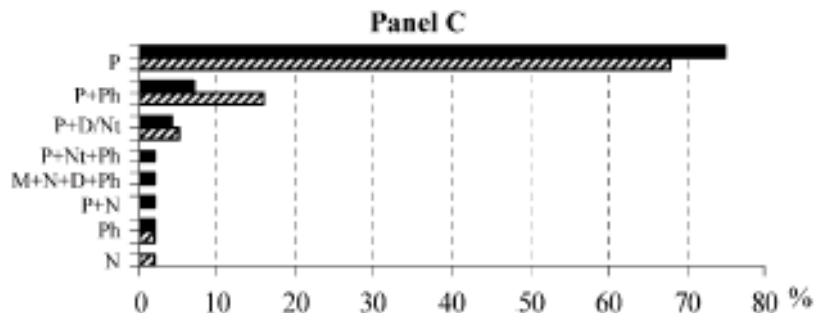
Ravasco P. et al. Clinical Nutrition (2004) 23, 113–119



oral



enteral



parenteral

Erstellen 
Monitoring 

P = Arzt; D = Diätassistentin; Nt = Ernährungswissenschaftler;
N = Pflegekraft; Ph = Apotheker

Arzt

- Indikationsstellung
- Monitoring
- Weiterbildung

Pflege

- Screening
- Administration
- Prozessablauf
- Equipment
- Patientenkontakt



Apotheker

- Pharmakologische Qualitätskontrolle
- Herstellung
- Logistik

Diätassistentin

- Screening
- Monitoring
- Orale Ernährungsoptionen
- Prozessablauf

Warum ein Ernährungsteam ?

- **Behandlungsqualität**
- **Kosteneffektivität**



Modernisierungsgesetz - kurz GMG

Modernisierung der Gesetzlichen Krankenversicherung GKV -

6 Qualitätsmanagement

6.1 Stiftung für Qualität und Wirtschaftlichkeit

Die Partner der Selbstverwaltung im Gesundheitswesen (Ärzte, Krankenhäuser und Krankenkassen) gründen eine staatsunabhängige Stiftung für Qualität und Wirtschaftlichkeit im Gesundheitswesen. Zu ihren Aufgaben gehört unter anderem die

Bewertung von Behandlungsleitlinien für die wichtigsten Krankheiten, die Abgabe von Empfehlungen zu Disease Management Programmen sowie die Nutzen-Bewertung von Arzneimitteln.

Qualitätssicherung

Der Nachweis eines Qualitätsmanagement und einer ‚Mindestqualität‘ der medizinischen Behandlung ist / wird Voraussetzung für die Leistungserbringung im Gesundheitssystem

Verbessert ein interdisziplinäres Ernährungsteam (TPN) das Patienten Outcome? Ein systematisches Review.

Carlie-Jane Naylor et al. JPEN 2004

TABLE I
Summary of studies

Author, date, and country	Sample	Members and involvement of the TPN team	Outcomes	
			Metabolic and electrolyte abnormalities	Catheter-related complications
Chris Anderson, 1996 USA	157 Adult medical patients requiring TPN; non-TPN team, n = 29; TPN team, n = 128	Physician specializing in clinical nutrition, nurse, pharmacist, medical resident, clinical nutrition fellow; TPN team involved in the care of all patients at the commencement of TPN	Patients managed by the TPN team had a lower incidence of: <ul style="list-style-type: none"> hyperglycemia (NS) hyperkalemia (NS) hyperphosphatemia (NS) hypohyponatremia (NS) hypokalemia (NS) hypomagnesemia ($p < .05$) 	Not reported
Dalton, 1984 USA	All patients requiring TPN; non-TPN team, n = 28; TPN team, n = 32	Physician, nurse, pharmacists, dietitian; patients receiving TPN therapy were managed jointly by their primary physicians and the TPN team	Patients managed by the TPN team had a reduced: <ul style="list-style-type: none"> incidence of sodium, potassium, phosphorus, and blood glucose abnormalities (NS) mean number of electrolyte and metabolic complications in patients managed by the TPN team ($p < .0002$) 	Patients managed by the TPN team had: <ul style="list-style-type: none"> fewer number of mechanical complications ($p < .1$) increase in the incidence of catheter sepsis (NS)
Fetter, 2000 UK	All new patients receiving parenteral nutrition over a 12-week period; non-TPN team, n = 28; TPN team, n = 12	Consultant biochemist, consultant gastroenterologist, nutrition support dietitian, gastroenterology dietitian, senior nurses (2), senior pharmacist; involved in the care of all patients at the commencement of TPN	Patients managed by the TPN team had a lower incidence of: <ul style="list-style-type: none"> hypernatremia (NS) hypokalemia ($p = .002$) hyperglycemia ($p < .001$) hypomagnesemia (NS) and a higher incidence of: <ul style="list-style-type: none"> hypernatremia (NS) hyperphosphatemia (NS) elevated ALT ($p < .001$) 	Patients managed by the TPN team had: <ul style="list-style-type: none"> no incidence of pneumothorax higher incidence of catheter-related infections (NS)
Fisher, 1996 USA	285 Patients requiring nutritional support; non-TPN team, n = 77; TPN team, n = 122	Attending gastroenterologist, gastroenterology fellow, certified nutrition support dietitian, certified nutrition support nurse, certified nutrition support pharmacist (2); physicians consulted the TPN team prior to the commencement of the treatment and approval was obtained	Patients managed by the TPN team had increased: <ul style="list-style-type: none"> hyper-hyperglycemia ($p = .0001$) hyper-hyperkalemia (NS) hyper-hyponatremia ($p = .0011$) hyper-hyperphosphatemia ($p = .0011$) hyper-hypomagnesemia ($p = .005$) 	Fewer patients managed by the TPN team had catheter-related sepsis (NS)
Gales, 1994 USA	Adult patients receiving parenteral nutrition; non-TPN team, n = 17; TPN team, n = 11	Clinical dietitians (5), staff pharmacist, hospital-based pharmacy school faculty member, rotating pharmacy and dietary interns/residents; TPN team involved when patient was determined to be requiring TPN	Patients managed by the TPN team had fewer abnormalities related to: <ul style="list-style-type: none"> sodium (NS) potassium (NS) chloride ($p = .0012$) bicarbonate (NS) BUN ($p = .0814$) creatinine ($p = .0561$) glucose ($p = .0799$) phosphorus (NS) bilirubin ($p = .0011$) finger stick blood glucose (NS) Higher abnormalities related to: <ul style="list-style-type: none"> magnesium 	Not reported
Hecky, 1979 USA	73 Patients receiving TPN; non-TPN team, n = 55; TPN team, n = 18	Physicians from surgical and medical services, pharmacists, nursing representatives, clinical dietitians, hospital epidemiologist; TPN team provided consultative services	Patients managed by the TPN team had a lower incidence of abnormalities related to: <ul style="list-style-type: none"> magnesium (NS) hyperglycemia (NS) hyperglycemia (NS) abnormal electrolyte profiles/diuresis (NS) A higher incidence of abnormalities related to: <ul style="list-style-type: none"> sodium (NS) potassium (NS) chloride (NS) calcium (NS) phosphorus (NS) 	Patients managed by the TPN team had a reduced incidence of: <ul style="list-style-type: none"> pneumothorax (NS) air embolism (NS) catheter sepsis (NS) total adverse reactions ($p < .005$)

TABLE II
(continued)

Author, date, and country	Sample	Members and involvement of the TPN team	Outcomes	
			Metabolic and electrolyte abnormalities	Catheter-related complications
Jacobs, 1984 USA	78 Consecutive patients who received TPN on a surgical service; non-TPN team, n = 21; transitional TPN team (6 months), n = 35; TPN team, n = 22	Nutritional nurse; other members of the team not reported; TPN team had complete responsibility for the delivery and monitoring of TPN	Patients managed by the TPN team had fewer: <ul style="list-style-type: none"> abnormal tests/patient/TPN day episodes of hyperglycemia/patient/TPN day 	Patients managed by the TPN team had a lower incidence of: <ul style="list-style-type: none"> catheter sepsis ($p < .05$) mechanical complications (NS)
Oliveira Fuster, 2000 Spain	86 Patients after surgery, medical treatment for neoplasms, pancreatitis, inflammatory intestinal disease, and AIDS; non-TPN team, n = 48; TPN team, n = 48	Endocrinologist (2), pharmacist, dietitians (4); involvement of the TPN team not reported	Patients managed by the TPN team had a lower incidence of: <ul style="list-style-type: none"> hyperglycemia hyponatremia hyperkalemia altered hepatic function (statistical significance of the result not reported) A higher incidence of: <ul style="list-style-type: none"> hypoglycemia hypokalemia hyperphosphatemia hypophosphatemia (statistical significance of the result not reported) 	Not reported
Traeger, 1986 USA	69 Patients administered TPN during the study period; non-TPN team, n = 45; TPN team, n = 24	Nurse (full or part time), dietitian, pharmacist, physicians (2); TPN team had complete responsibility for delivery and monitoring of TPN	Patients managed by the TPN team had a reduced incidence of: <ul style="list-style-type: none"> hyper-hyperkalemia (NS) Higher incidence of: <ul style="list-style-type: none"> hyper-hyperphosphatemia (NS) hyperglycemia (NS) hyper-hypomagnesemia (NS) total number of metabolic complications (NS) 	Patients managed by the TPN team had a lower incidence of: <ul style="list-style-type: none"> infection/sepsis (NS) malposition (NS) pneumothorax (NS) total complications ($p < .05$)
Trujillo, 1999 USA	150 Patients requiring TPN; non-TPN team, n = 150; TPN team, n = 49	Physicians, dietitians, nurse (expertise in nutrition management of complex patients); consultation with the nutrition support team was mandatory	Patients managed by the TPN team had the following electrolyte abnormalities on fewer days: <ul style="list-style-type: none"> hypokalemia hypernatremia total metabolic complications ($p = .004$) on greater number of days: <ul style="list-style-type: none"> hypo-hyperglycemia hypomagnesemia, hyperkalemia 	Not reported
Png, 1997 Singapore	97 Patients receiving TPN over a 12-month period; non-TPN team, n = 37; TPN team, n = 36	Surgeons (3), pharmacists (2), dietitian, infection control nurse, research assistant; later expanded to include anaesthetists, medical interns, pediatricians; TPN team involved when patient was determined to be requiring TPN	Not reported	Fewer patients managed by the TPN team had: <ul style="list-style-type: none"> pneumothorax catheter malposition blocked catheter catheter sepsis

NS, not statistically significant; AIDS, acquired immune deficiency syndrome; AST, aspartate aminotransferase serum; ALT, alanine aminotransferase serum; BUN, blood urea nitrogen.

Verbessert ein interdisziplinäres Ernährungsteam (TPN) das Patienten Outcome ? Ein systematisches Review.

Carlie-Jane Naylor et al. JPEN 2004

TABLE I
Summary of studies

TABLE II
(continued)

Author, Year, Country	Patients	Intervention	Outcomes	Outcomes
Fisher, 1996 USA	285 Patients requiring nutritional support; non-TPN team, n = 77; TPN team, n = 122	Attending gastroenterologist, gastroenterology fellow, certified nutrition support dietitian, certified nutrition support nurse, certified nutrition support pharmacist (2); physicians consulted the TPN team prior to the commencement of the treatment and approval was obtained	<ul style="list-style-type: none"> Fewer patients managed by the TPN team had uncorrected <ul style="list-style-type: none"> hyper-hypoglycemia (p = .0001) hyper-hypokalemia (NS) hyper-hyponatremia (p = .0001) hyper-hypophosphatemia (p = .0001) hyper-hypomagnesemia (p = .008) 	Fewer patients managed by the TPN team had catheter-related sepsis (NS)
Gales, 1994 USA	Adult patients receiving parenteral nutrition; non-TPN team, n = 17; TPN team, n = 11	Clinical dietitians (5), staff pharmacist, hospital-based pharmacy school faculty member, rotating pharmacy and dietary interns/residents, TPN team involved when patient was determined to be requiring TPN	<ul style="list-style-type: none"> hyper-hypokalemia (NS) hyper-hyponatremia (p = .0001) hyper-hypophosphatemia (p = .0001) hyper-hypomagnesemia (p = .008) 	<ul style="list-style-type: none"> infection/sepsis (NS) malposition (NS) pneumothorax (NS) total complications (p < .05)
Trujillo, 1999 USA	159 Patients requiring TPN; non-TPN team, n = 150; TPN team, n = 49	Physicians, dietitians, nurse (expertise in nutrition management of complex patients); consultation with the nutrition support team was mandatory	<ul style="list-style-type: none"> hyper-hypokalemia (NS) hyper-hypomagnesemia (NS) hyper-hypophosphatemia (NS) hyper-hypoglycemia (NS) total number of metabolic complications (NS) 	Not reported
Hokey, 1979 USA	73 Patients receiving TPN; non-TPN team, n = 55; TPN team, n = 18	Physicians from surgical and medical services, pharmacists, nursing representatives, clinical dietitians, hospital epidemiologist; TPN team provided consultative services	<ul style="list-style-type: none"> hyper-hypokalemia (NS) hyper-hypomagnesemia (NS) hyper-hypophosphatemia (NS) hyper-hypoglycemia (NS) total adverse reactions (p < .005) 	<ul style="list-style-type: none"> infection/sepsis (NS) malposition (NS) pneumothorax (NS) total complications (p < .05)
Frsg, 1997 Singapore	97 Patients receiving TPN over a 12-month period; non-TPN team, n = 37; TPN team, n = 36	Surgeons (3), pharmacists (2), dietitian, infection control nurse, research assistant; later expanded to include anaesthetists, medical interns, pediatricians; TPN team involved when patient was determined to be requiring TPN	<ul style="list-style-type: none"> hyper-hypokalemia (NS) hyper-hypomagnesemia (NS) hyper-hypophosphatemia (NS) hyper-hypoglycemia (NS) total adverse reactions (p < .005) 	<ul style="list-style-type: none"> infection/sepsis (NS) malposition (NS) pneumothorax (NS) total complications (p < .05)

NS, not statistically significant; AIDS, acquired immune deficiency syndrome; AST, aspartate aminotransferase serum; ALT, alanine aminotransferase serum; BUN, blood urea nitrogen.

Kosten in der Intensivmedizin

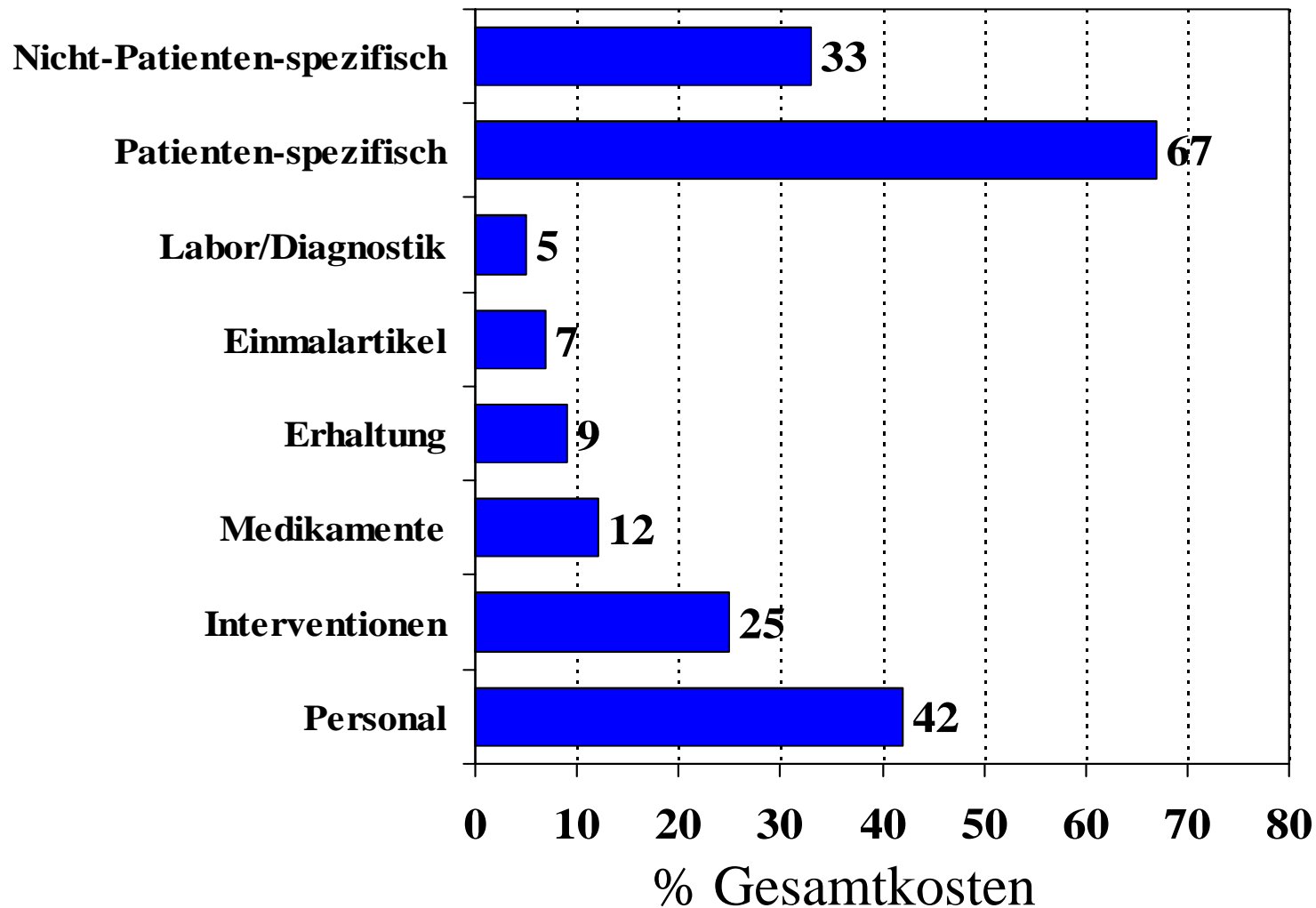
- **Kosten für einen Tag Intensivmedizin: 1000 €**

- **Kosten Ernährungstherapie***
 - enterale Sondenernährung 33 €
 - parenterale Ernährung 69 €

*inklusive Labor, Pflege und Einmalartikel

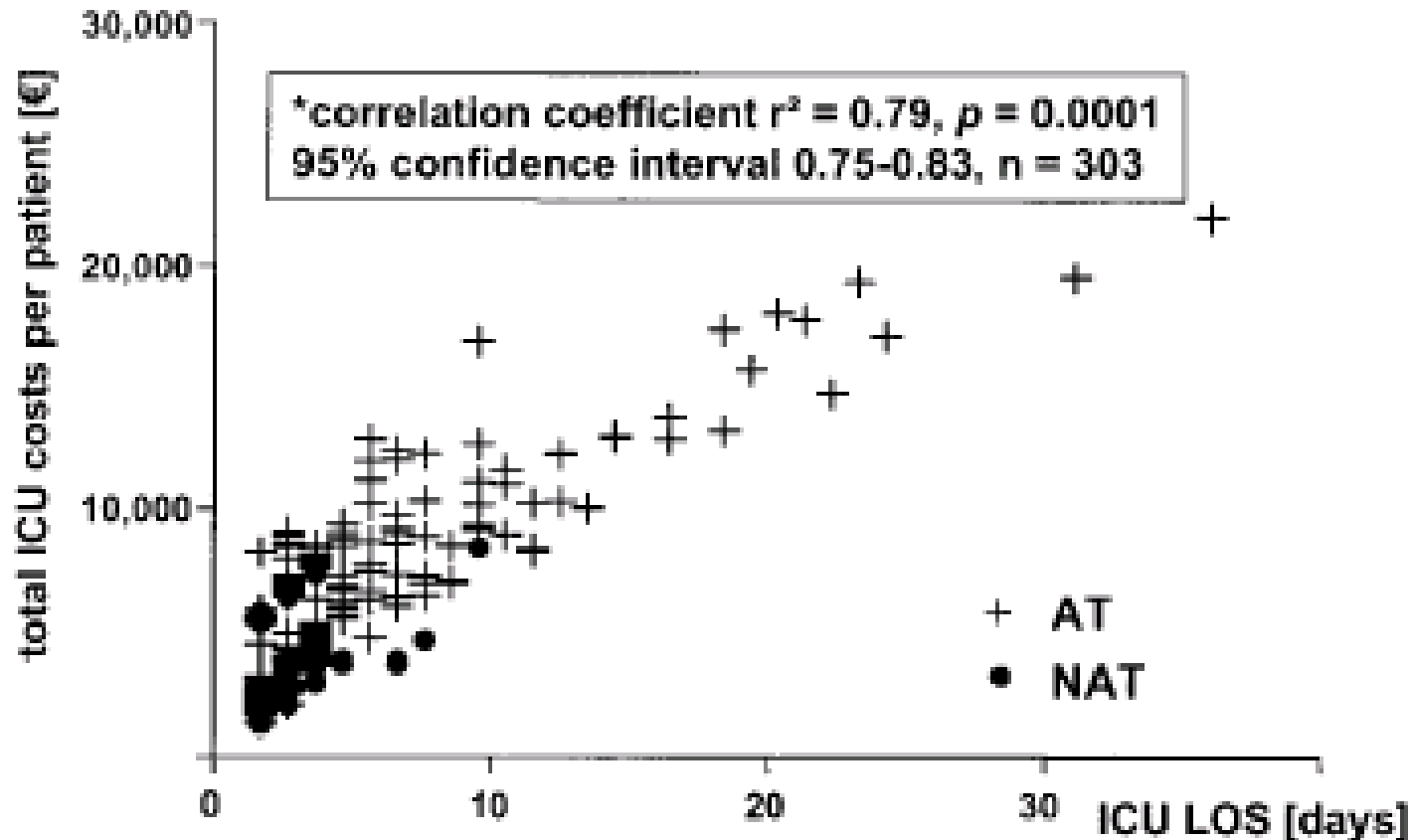
Zusammensetzung der Kosten in der Intensivmedizin

Graf J et al. Intensive Care Med 2002;28:324-331



Ressourcenverbrauch und Kosten verursachende Faktoren in einer deutschen Intensivstation

Graf J et al. Intensive Care Med 2002;28:324-331



**66 % aller Kosten für Patienten
mit Liegezeit > 8 Tage (17%Pat.)**

Cost savings of an adult hospital nutrition support team

Kennedy J et al. Nutrition 21 (2005) 1127–1133

Leicester Royal Infirmary, Leicester, United Kingdom

Table 4
Tangible cost savings for reduced infection rate and avoided PN episodes

Decreased CRS in NST year		
PN episodes	78	
Assume pre-NST CRS rate	71%	Weniger infektiöse
Expected CRS number	58	Komplikationen: £7974
Actual CRS number	23	
Avoided CRS number	35	
Cost of one CRS episode	£227.83*	
35 avoided CRS episodes	=£7974.05	
Avoided PN episodes (<i>n</i> = 55)		
Catheter insertion, PN (8 d), and catheter removal (Appendix 2)	$55 \times £708.44 = £38\,964.20$	Weniger TPN: £ 42 740
Avoided CRS (<i>n</i> = 39), assumes pre-NST CRS rate of 71%	$39 \times £227.82 = £8884.98$	
Enteral feeding (<i>n</i> = 55) assumes all are enterally fed 1.5 L/d for 8 d	$55 \times £92.88 = £5108.40$	
Cost savings for avoided PN	$£38\,964.20 + £8884.98 - £5108.40 = £42\,740.78$	
Total cost savings for decreased infection rate and avoided PN episodes	$£7,974.05 + £42,740.78 = £50\,714.83$	Gesamt: £ 50714

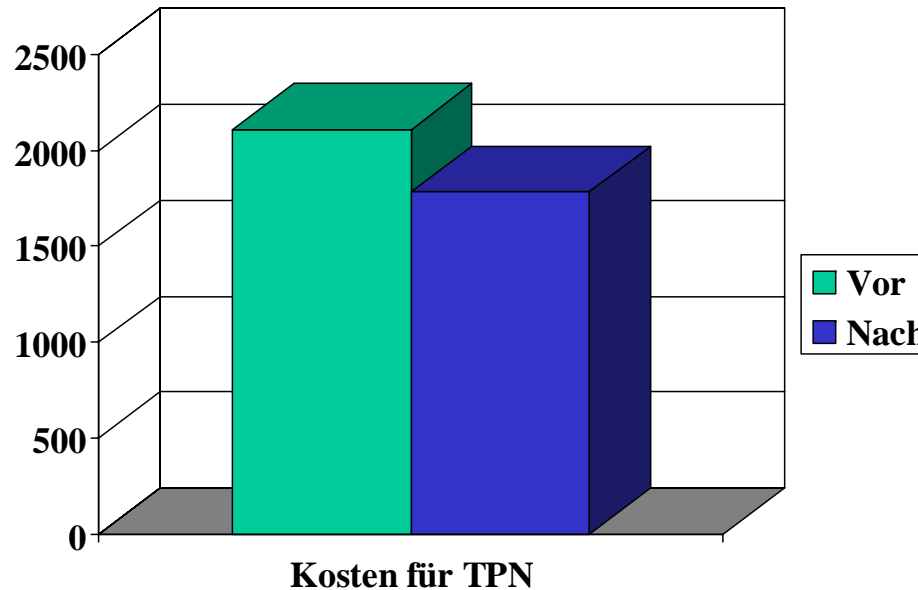
CRS, catheter-related sepsis; NST, nutrition support team; PN, parenteral nutrition

* Blood cultures at £19.29 + CRS treatment (5 d of intravenous vancomycin) at £208.54.

Kosteneffektivität

Trujillo EB et al. *JPEN*. 1999; 23:109–113. Chris Anderson D et al. *JPEN*. 1996;20:106–210.

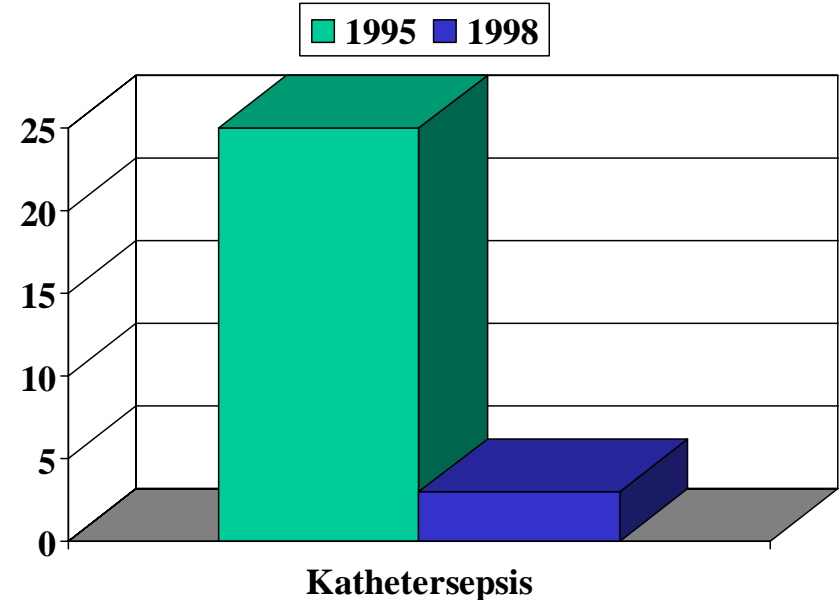
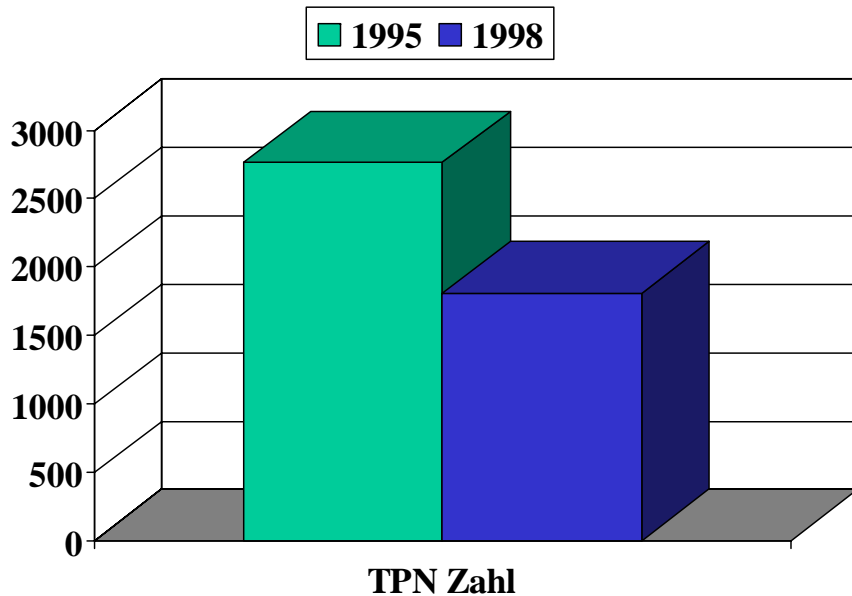
- Anderson et al.: Kosten vor/nach Implementierung eines E Teams



- Trujillo et al.: Reduktion der TPN assoziierten Kosten um US \$74 pro TPN Tag bei Patient, der vom NST betreut wurde

Rolle eines Ernährungsteam in der Vermeidung von nicht indizierter parenteraler Ernährung

Piquet M. et al. Clinical Nutrition (2004) 23, 437

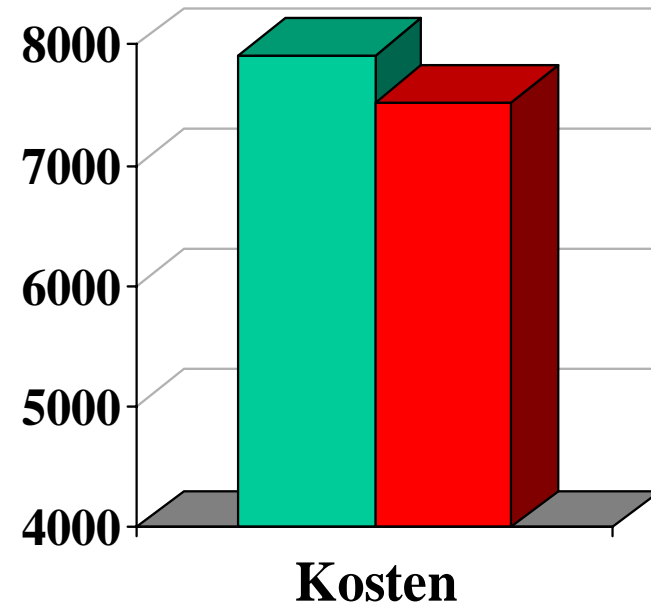
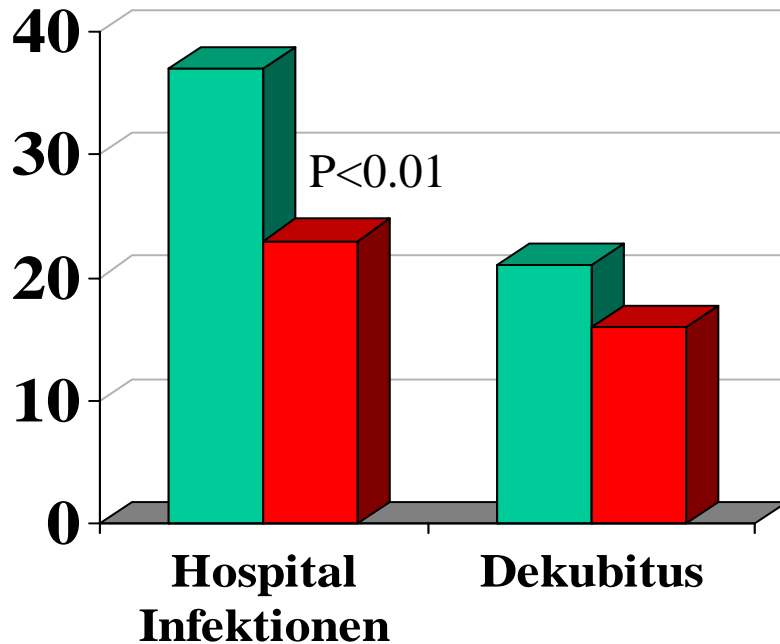


**Kosteneinsparung für weniger Material /
Apothekenkosten und sek. Kosten der
Infektionen: 245 000/Jahr**

Effekt eines Ernährungsteam in der Betreuung geriatrischer Patienten

Rypkema G et al. J Nutr Health Aging. 2004;8

■ Kontrolle (n=158) ■ Intervention (n=140)



Verbessert ein interdisziplinäres Ernährungsteam (TPN) das Patienten Outcome ? Ein systematisches Review.

Carlie-Jane Naylor et al. JPEN 2004

Fazit:

Es gibt gute Hinweise, dass ein spezialisiertes Team für die (parenterale) Ernährung die Behandlungsqualität verbessert und dabei auch Kosteneffektiv sein kann.

Es fehlen jedoch valide Daten unter den neuen Bedingungen im deutschen Gesundheitswesen!

Leistung	Punkte	N / Jahr	Summe
Aufnahmestatus klein	10	800	8.000
Aufnahmestatus groß	20	500	10.000
Ernährungsstatus	15	500	7.500
Ernährungsanamnese	10	500	5.000
Ernährungsberatung kurz	25	300	7.500
Ernährungsberatung lang	40	200	8.000
Kostabsprache	15	1000	15.000
Ernährungsprotokoll mit Auswertung	75	50	3.750
Aufklärung über künstliche Ernährung	30	100	3.000
PEG Verband mit Beurteilung	20	400	8.000
PEG Verband bei peristomalem Infekt	40	150	6.000
PEG Verband bei defektem Material	50	150	7.500
BIA	30	400	12.000
Individuelle Rezeptur erstellen	30	300	9.000
Individuelle parenterale Ernährung zubereiten	90	1000	90.000
Kostaufbauplan	15	300	4.500
Absprache mit Krankenkasse (Attest)	20	110	2.200
Kontaktaufnahme mit Versorger	20	150	3.000
Schulung des Patienten	100	40	4.000
Arztbrief	20	110	2.200
Sondenkostbestellung	2	1500	3.000

SUMME

219150

Leistungen eines E Team pro Jahr

Momma et al.
Akt Ernährungsmedizin
2006

Personalkosten und die vom Controlling vorgeschlagene Minutenpreise für die interne Leistungsverrechnung (ILV)

Momma et al. Akt Ernährungsmedizin 2006

Personal	Brutto	ILV-Berechnung
• halbe Arztstelle	35.000 €	80cent/min
• zwei Pflegekräfte	90.000 €	50cent/min
• zwei Diätassistenten	90.000 €	50cent/min
<hr/>		
Gesamt	215 000 €	

Erbrachte Leistung 219 500 Punkte

Somit ergibt sich pro Punkt etwa 1 € Personalkosten.

Beispiel für eine Heimenterale Versorgung

Ein Pat. erhält eine PEG-Aufklärung und wird nach PEG-Anlage durch das Ernährungsteam betreut. Es werden folgende Prozeduren durchgeführt:

- Aufnahmestatus groß
- Ernährungsstatus und Ernährungsanamnese
- Aufklärung über künstliche Ernährung
- PEG Verband mit Beurteilung
- Sondenkostbestellung
- Kostaufbauplan
- Absprache mit Krankenkasse (Attest)
- Kontaktaufnahme mit Versorger
- Schulung des Patienten
- Arztbrief

Dies ergibt insgesamt **312 Punkte** und einen Zeitaufwand von ca. 5 Stunden \cong **312 €**

Beispiel für eine Heimparenterale Versorgung

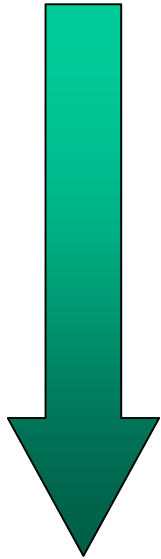
Ein Pat. erhält drei Tage vor Entlassung eine individuelle TPE und die häusliche Versorgung wird organisiert. Es werden folgende Prozeduren durchgeführt und berechnet:

- Aufnahmestatus groß
- Ernährungsstatus und Ernährungsanamnese
- Aufklärung über künstliche Ernährung
- Individuelle Rezeptur erstellen
- Individuelle parenterale Ernährung zubereiten (3x)
- Absprache mit Krankenkasse (Attest)
- Kontaktaufnahme mit Versorger
- Arztbrief

Dies ergibt insgesamt **435 Punkte** und einen Zeitaufwand von ca. 7 Stunden \cong **435 €**

Das interdisziplinäre Ernährungsteam: Von der Vision zur Realität ?

Vision



Realität

- Definition des Aufgabengebietes
- Nachweis der Effektivität
 - Behandlungsqualität
 - Kosteneffektivität
- Qualitätssicherung in der Ernährung
- Adäquate Vergütung der Leistungen