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# Determinants of complementary feeding behaviour

Part 2: Influence of migration background and socio-economic status on complementary feeding behaviour of women in Lower Austria

Elisabeth Höld, St. Pölten/Austria; Ariane Hitthaller, Petra Ruso, Wiener Neustadt/Austria; Alexandra Kolm, St. Pölten/Austria

# Summary

As described in the first part of the publication, according to studies in Europe, along with educational level, migrant background (MB) and socio-economic status (SeS) count as especially relevant factors influencing complementary feeding behaviour. The present study addresses the question of how MB and SeS affect and mutually influence complementary feeding behaviour.

In the framework of a needs analysis for the ARGEF GmbH project "Baby couch – bewusst von Anfang an", 803 women were questioned in the Austrian province of Lower Austria.

Of the women surveyed 8.6% had an MB and a low SeS, 4.1% an MB and a high SeS, 39.1% no MB and a low SeS and 48.2% no MB and a high SeS. Almost all mothers had informed themselves during their pregnancy on topics related to their baby's nutrition. It was thereby shown that information quality and quantity were influenced by MB as well as by SeS. Of the mothers surveyed, 11% began complementary feeding too soon. In particular, this affected women with an MB. The majority of the women followed the Austrian complementary feeding recommendations. However, it was also found that women with an MB, especially those with a low SeS, more frequently used unsuitable foods and beverages as part of complementary feeding.

The analyses supports the assumption that mothers with an MB and/or a low SeS constitute a vulnerable group for unfavourable complementary feeding behaviour, and that they should be offered appropriate information on nutrition.

Keywords: infant nutrition, complementary feeding, migration, socio-economic status, health behaviour fluencing complementary feeding behaviour.

In the present study, taking into account the SeS of women with an MB, the complementary feeding behaviour in a sample of mothers in Lower Austria<sup>1</sup> was analyzed and compared with those without an MB, in order that the effects and interactions of these parameters on complementary feeding behaviour could be delineated. The survey was part of the Arbeitsgemeinschaft Gesundheitsförderung GmbH (ARGEF)<sup>2</sup> project development "Baby couch bewusst von Anfang an". Implementation was entrusted to the Austrian marketing-research company marketmind GmbH.

The results should on the one hand show gaps in the current research, and on the other hand – through the identification of vulnerable target groups – provide the basis for designing more efficient measures and recommendations in the field of health promotion.

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# Introduction and objective

As described in the first part of the publication [1], the optimal timing of complementary feeding as well as the correct choice of food in the first months of life are of great importance for health. Along with a mother's young age most notably lower level of education or lower socio-economic status (SeS) as well as migrant background (MB) could be identified as adverse factors in-

# Methodology

# Data collection

For the analysis, a random sample of mothers with infants or small children was drawn based on the 2007–2011 applications for child-

<sup>&</sup>lt;sup>1</sup> Lower Austria is one of nine Austrian provinces:

<sup>&</sup>lt;sup>2</sup> ARGEF GmbH = *Arbeitsgemeinschaft Gesundheitsförderung GmbH* is active in the areas of health care, health preservation and applied health promotion in Austria:

care allowance from the Lower Austrian regional health insurance. The survey was conducted from 18th of January to 2nd of February 2011 by marketmind GmbH. The women were questioned as desired in German, Turkish, Croatian or Russian using Computer Aided Telephone Interviews (CATI). The questionnaire was designed by the ARGEF GmbH authors in collaboration with marketmind GmbH. The MB was determined by self-assessment ("Would you describe yourself as a migrant?"). From 6,344 contact attempts, a survey of 803 women was carried out.

## Statistical analyses

For the delineation of descriptive parameters for metric data, the arithmetical average and a 95% confidence interval were specified. For interval- or nominally scaled variables, the data was described by frequencies. Mean-differences between two groups were calculated using the t-test for independent samples. With more than two groups a single factor variance analyses (ANOVA) was performed with post-hoc procedure. In case of violation of the conditions these analyses were performed using the Mann-Whitney U Test and the Kruskal-Wallis Test. To avoid alpha error when comparing more than two groups, the p-value was corrected by means of Bonferroni-Correction ( $p_{korr}$ ). For statements about distribution differences in nominally scaled variables, cross tabulations with chi-square and standardized residuals were calculated. In order to detect significant relationships, correlations were calculated. The significance level was set at five per cent.

The SeS was calculated by means of an index based on indicators as shown in • Overview 1. The index is based on the Winkler-Index [2, 3], which is why the indicators mentioned were equivalently incorporated. When all indicators are available, between 3 and 15 points could be reached. In the case of the absence of a response (40 questionnaires) this was replaced by the arithmetical average of the values of the other two indicators [3]. For further analyses the groups were structured so that each included approximately the same number of index values [3]. This means that women with three to eight points were assigned to those with a low SeS, and mothers with more points to those with a high SeS. In a final step, women with and without an MB were assigned to the socio-economic groups (
 Overview 2). In the following analyses, only significant differences between the four groups are delineated in more detail.

## OVERVIEW 1: INDICATORS FOR THE CALCULATION OF SES

- highest completed formal education (compulsory school = 1 point, apprentice/vocational school = 2 points, college without matriculation<sup>1</sup> = 3 points, ASS<sup>2</sup>/SVS<sup>3</sup>/college with matriculation = 4 points, university/university of applied sciences = 5 points)
   professional position before parental leave<sup>4</sup>
- (job seeking = 1 point, not employed/working in the household = 2 points, worker = 3 points, employee = 4 points, self-employed = 5 points) and
- net household income
   (≤ 999 € = 1 point, 1,000–1,999 € = 2 points, 2,000–2,999 € = 3 points, 3,000–3,999 € = 4 points, ≥ 4,000 € = 5 points)

- $^{3}$  SVS = secondary vocational school
- <sup>4</sup> parental leave = maternity leave
- SES = socio-economic status

MB & SeS low	MB & SeS high
no MB & SeS low	no MB & SeS high

## Fig. 1: The four comparison groups according to migrant background (MB) and socio-economic status (SeS)

# Results

In total, 803 women were questioned. The majority had no MB (87.3%). Slightly over half of all women had a high SeS (52.3%). Among the women with an MB, most were born in the former Yugoslavia (28.4%) or Turkey (26.4%). Thereafter followed in descending order these countries of birth: Romania (7.8%), Slovakia (5.8%), Hungary (5.0%), Germany (5.0%), Austria (4.9%), Czech Republic (3.9%), Africa/Burundi (1.9%), Poland (1.9%) and in each case with one percent: Ukraine, Tunisia, the Netherlands, India, Slovenia, Italy, Russia, Albania and Armenia.

It was found that women with no MB and with a low SeS were younger than women with a high SeS, independent of MB (MB:  $p_{korr} = 0.036$ ; without MB:  $p_{korr} < 0.001$ ). Also, women with an MB and a low SeS were younger than women without an MB but with a high SeS ( $p_{korr} = 0.006$ ). On the other hand, marital status showed itself to be above all influenced by MB. Regarding the age of the child and the number of births ( $p_{korr} > 0.050$ ), no significant differences between the groups were shown ( $\bullet$  Table 1).

## Information behaviour

During pregnancy, the majority had informed themselves about the baby's nutrition/breastfeeding/complementary food and transition to a normal diet. Women with an MB sought information about these topics less often than women without an MB. With regard to SeS, women with an MB and a low SeS informed themselves significantly less often; women without an MB but with a high SeS informed themselves more frequently than the other mothers about these issues.

<sup>&</sup>lt;sup>1</sup> matriculation = higher school certificate

<sup>&</sup>lt;sup>2</sup> ASS = academic secondary school

	Significance (p)	Migrant background				No migrant background			
		SeS ↓		SeS ↑		SeS ↓		SeS ↑	
		n/mw	%/ [95 %-KI]	n/mw	%/ [95 %-KI]	n/mw	%/ [95 %-KI]	n/mw	%/ [95 %-KI]
Sample size <sup>1</sup>		n = 69		n = 33		n = 314		n = 387	
Mother's age (years)	p < 0.001	30.2	[28.6; 31.7]	33.4	[31.3; 35.4]	30.3	[29.6; 30.9]	32.8	[32.3; 33.3]
Marital status	p < 0.001								
single		1	1.4	-	-	50	15.9	10	2.6
partnership		4	5.8	1	3.0	71	22.6	65	16.8
marriage		64	92.8	32	97.0	193	61.5	312	80.6
Children									
Sample size <sup>1</sup>		n = 67		n = 32		n = 300		n = 373	
Age of the youngest									
child (months)	p = 0.363	17.9	[14.5; 21.3]	16.6	[12.2; 20.9]	18.0	[16.5; 19.4]	19.4	[18.1; 20.8]
births total (number)	p = 0.030	2.0	[1.8; 2.2]	2.2	[1.8; 2.5]	1.9	[1.8; 2.0]	2.0	[1.9; 2.1]

### Tab. 1: Sample description (n = 803)

[95 %-CI] = 95 %-Confidence Interval; mv = mean value; n = sample size; SeS  $\downarrow$  = lower socio-economic status; SeS  $\uparrow$  = high socio-economic status

<sup>1</sup>Missing information leads to different sample sizes.

significant differences = printed in bold

When questioned about their sources of information concerning early childhood (multiple response), the most frequent answer was books. This was followed in descending order by: other mothers/friends/family, midwife/paediatrician/hospital, gynaecologist, magazines/brochures, internet, counselling centres and other sources (• Table 2).

In a further step, the women were asked about their knowledge regarding the optimal time for the introduction of complementary food. This showed that the sources of information were for the most part congruent with sources on early childhood issues. Women with an MB, especially those with a low SeS, often could not answer or obtained this knowledge from baby food labels. Also, they never began the introduction of complementary foods on the basis of signs of maturity in the child (• Table 2).

## **Complementary food**

Due to the age of the children at the time of the survey (+ Table 1), the

majority of participating mothers (85.3%) had already transitioned the youngest child to complementary food or family food.

On average, complementary food was introduced after 6.5 [6.3; 6.7] months, somewhat later than that which they estimated to be an optimal time of 6.1 [6.0; 6.3] months. Women with an MB estimated the optimal time of introduction to be earlier (5.9 [5.5; 6.3] months) than women without an MB (6.2 [6.1; 6.3] months p < 0.001), especially if they had a high SeS ( $p_{korr} < 0.001$ ). On average, women with an MB introduced complementary food at 5.7 [5.1; 6.2] months, while women without an MB took this step significantly later (6.6 [6.4; 6.8] months, p < 0.001) (• Figure 1).

If one contrasts the estimated and the actual timing of the introduction of complementary food (• Figure 1), it can be seen that women without an MB but with a high SeS introduced complementary food later than their own estimated optimum time. Both the estimated and the actual timing of the introduction of complementary food were however, on average in all groups, within the time window set by Austrian complementary feeding recommendations (beginning at the 5<sup>th</sup> month of life to the end of the 6<sup>th</sup> month [4]).

Eleven point one percent (11.1%) of all the women introduced complementary food too early (latest at the 4<sup>th</sup> month of life). Independent of SeS, women with an MB were more frequently among those who began complementary feeding too early (p < 0.001) ( $\bullet$  Figure 2).

The complementary foods used include in descending order: vegetables/fruits, grains, mildly spiced foods, lean meats, legumes, lowfat foods, sausage/ham or similar, snack foods, honey, nuts, seeds, sweets and dishes made from raw eggs/fish/meat. With regard to MB, it was found that women with an MB used recommended foods less often, especially mildly spiced foods and lean meats, and frequently used detrimental foods, in particular, nuts, seeds, honey and sweets. With increasing SeS, the recommendations concerning

	Total [%]	MB [%]	No MB [%]	MB and SeS↓[%]	MB and SeS ↑ [%]	No MB and SeS 1	No MB and SeS ↑	
						[%]		
I have informed myself about topics concerning the baby's nutrition/ breastfeeding/comple- mentary food/transition to a normal diet	93.2	81.4	94.9	75.4	93.9	93.6	95.9	
		р «	: 0.001		p < 0.001			
Important source of information is (multiple response)								
mothers/friends/ family	22.0	17.6	22.6	13.0	27.3	30.3	16.5	
		p =	= 0.252	p < 0.001				
gynaecologist	13.4	21.6	12.3	23.2	18.2	15.0	10.1	
		p =	= 0.010		p = 0.014			
midwife/paediatri- cian/hospital	13.6	18.6	12.8	21.7	12.1	11.5	14.0	
		p =	= 0.111		p = 0.156			
books	22.4	13.7	23.7	13.0	15.2	19.1	27.4	
		p =	= 0.024		p = 0.007			
magazines/brochures	11.5	6.9	12.1	4.3	12.1	10.8	13.2	
		p =	= 0.119		p = 0.195			
internet	10.6	11.8	10.4	13.0	9.1	9.2	11.4	
		p = 0.679			p = 0.712			
counselling centres	2.7	2.0	2.9	1.4	3.0	1.9	3.6	
		p =	= 0.606		p = 0.499			
baby food	1.7	4.1	1.3	6.1	0.0	2.2	0.5	
		р <	: 0.001		p < 0.001			
other	1.7	0.0	2.0	0.0	0.0	1.0	2.8	
		p =	= 0.150		p = 0.128			
no information source. Only reactions/signs of maturity in the child	7.3	0.0	8.3	0.0	0.0	9.3	7.5	
		р «	: 0.001		p < 0.001			
do not know	1.1	5.1	0.6	7.6	0.0	0.6	0.5	
		р <	0.001		p < 0.001			

Tab. 2: Important information source for the participating women in regard to topics concerning pregnancy and infants as well as the timing of complementary feeding (multiple response; n = 803)
MB = migrant background; SeS ↓ = lower socio-economic status; SeS ↑ = high socio-economic status significant differences = printed in bold

mildly spiced foods and lean meats were more often implemented (• Figure 3).

The beverage most commonly used together with complementary foods was water. With respect to MB, it was shown that women with an MB less often used tap water directly from the tap and more frequently used mineral water containing carbon dioxide than women without an MB. Regarding MB and SeS, the most significant differences were shown in the use of tap water. Here, the use of tap water increased with increasing SeS independent of MB ( $\bullet$  Figure 4).

# Discussion

The European studies featured in the first part of the publication [1] show that mothers with an MB and/or a low SeS are a particularly vulnerable group for unfavourable complementary feeding behaviour. The present study addresses the question of how MB and SeS affect the com-

# Science & Research | Original Contribution



Fig. 1: The optimal estimated time and the actual time of the introduction of complementary food by the participating women (n = 803) Error bar: 95% confidence interval; MB = migrant background; SeS ↓ = lower socio-economic status; SeS ↑ = high socio-economic status \*\*\* p < 0.001</p>

I recommended time period for the introduction of complementary food





MB = migrant background; SeS  $\downarrow$  = low socio-economic status; SeS  $\uparrow$  = high socio-economic status

plementary feeding behaviour of mothers in Austria.

## Information sources

The three most important sources of information concerning early childhood issues such as complementary feeding in the collective group examined were books, the social environment and medical personnel. The choice of sources for health information depends on numerous factors such as gender, age and level of education [5]. MB is also a major influencing factor on health related information behaviour. According to a study by GERKEN et al., Russian and Turkish speaking migrants in Germany primarily use the physician and family/friends as sources of information. These are followed by newspapers, magazines and the internet [6]. Similar results can be seen in the present study; women with an MB, especially those with a low SeS, use books less often and more frequently the gynaecologist as well as their social environment than women without an MB. In contrast, women without an MB but with a high SeS use books more often and their social environment less often to generate information. The problem with information from the social environment is that often such information is not sufficiently based on well-founded science and can be counterproductive for the children's health. A study showed that the health knowledge of opinion leaders from socio-economically disadvantaged groups, in part, does not meet established scientific recommendations. Thereby, already existing health inequalities become further enhanced [7].

## **Complementary food**

The optimum timing for the introduction of complementary food was estimated by women with an MB earlier (5.9 months) than women without an MB (6.2 months). In a qualitative study by HILBIG et al. [7], these results are similar to the estimate of German and Turkish mothers regarding the optimal timing for the introduction of complementary food (4<sup>th</sup> to 7<sup>th</sup> month of life). The knowledge of optimal timing

for the introduction of complementary food for women without an MB, especially those with a low SeS, either originates from information offered by the food industry or they could not name the source of the information. This result is also confirmed in the study by HIL-BIG [8]. However, information from the food industry cannot be regarded as an independent and reliable source. A German study revealed that 70% of the available advisory brochures about complementary foods needed revision with regard to the recommendations. More than one third of the criticized brochures came from the food industry, and there was no food industry advisory brochure which completely and correctly implemented the re-







# Fig. 4: Beverages most frequently used with complementary food by the participating women (n = 803) \*\*\* p < 0.001

MB = migrant background; o. s. = or similar; SES  $\downarrow$  = low socio-economic status; SES  $\uparrow$  = high socio-economic status

commendations [9]. A recent study in the Lancet also notes that the industry has a special interest in attracting children as customers. Frequent contact with products trains taste preferences, raises brand loyalty and ultimately produces higher profits [10]. Therefore, the situation that industry/ food packaging serves as an information source for child nutrition is to be regarded as problematic. With information on food packaging, the language barrier can be an additional factor for misunderstanding surrounding the introduction of complementary food. According to HILBIG et al. [8] Turkish women misunderstood the reference "after the 4<sup>th</sup> month" as "in the 4<sup>th</sup> month" and misinterpreted the term complementary food as food between meals. In addition to these difficulties introduced in the present study, women with an MB extrapolated the timing for the introduction of complementary foods less often from the child's behaviour (signs of maturity). But exactly that is advised in the Austrian and German complementary food recommendations [4, 11].

The majority of the mothers questioned had shifted the youngest child after 6.5 months to complementary food. This is later than the Austrian recommendations on complementary food advises [4]. Only for women without an MB but with a high SeS do the estimated optimal time and the actual time for the introduction of complementary food differ. They introduced complementary food half a month later than their optimum estimated time. This behaviour could be problematic since around the age of 6 months, the energy and nutrient requirements of the child can no longer be exclusively met by breastfeeding [12].

Approximately every tenth women started the introduction of complementary food too early (latest with the 4<sup>th</sup> month of life). Independent of SeS, this especially affected women with an MB. Premature introduction of complementary food to children with an MB can also be shown in German studies [13, 14]. This adverse behaviour could be ascribed to the behaviour in the countries of origin. Women in Turkey contrary to Turkish recommendations (after 6 months of age) [16] often introduce complementary food too early [15, 16]. As described in the first part of the publication, this can have far-reaching health consequences for the child.

# Complementary foods used

The majority of women followed the Austrian complementary food recommendations [4] and used mainly recommended foods and beverages. However, it was also found that women with an MB, especially those with a low SeS, more often use unsuitable foods and beverages such as, nuts, seeds, honey, sweets, dishes from raw eggs and carbonated mineral water.

## Limitations

Limitations of this study are in particular the self-definition of migrant background by the respondents without considering the length of stay and the native countries of the parents, in addition, unequal groups of women with and without an MB. As highlighted through analysis of the responses, some questions should have been more clearly formulated in order to produce meaningful results. So it is for example, i.a. not clear whether by tea, fruit tea or black tea (not suitable due to caffeine content) is meant.

# Conclusion

People with an MB in Austria as well as in the European Union are increasingly affected by health inequalities. To counteract this, first of all the influencing factors on health behaviour need to be explored in order to subsequently define targeted measures and to review them in terms of effectiveness and cost-benefit. This study provides insights into the factors that influence early childhood nutrition in Austrian families with an MB. Despite the limitations of this study, the results point to differences in the complementary feeding behaviour of women with and without an MB. The situation for women with an MB and a low SeS seems to be disadvantageous. They are the least informed, comprise the largest group of those who introduce complementary foods too early, and most frequently use foods unsuitable for complementary feeding.

The findings emphasize that target group specific information channels are little used and as a result health inequalities are furthered. Medical professionals such as gynaecologist play a very important role as a source of health information for women with an MB, especially for those with a low SeS; which is why culturally sensitive, empathetic counselling approaches are particularly important. Specially designed training programmes for these professional groups should be encouraged. In addition to cultural influences it is necessary to take into account language barriers. Health professionals must use clear and

simple terms. Where appropriate, it is advisable to call in an interpreter or to pursue peer counselling approaches.

In addition to women with an MB, women without an MB and with a low SeS need a special range of information, since they mainly use their social environment as a source of information and are seldom reached through quality-assured information channels. In Austria and Germany, "Frühe Hilfen" (= "Early Assistance"), which is directed principally toward socially disadvantaged families or families with special burdens, represents an offer to promote development opportunities and health from early childhood on [17].

Pregnancy and the first years of a child's life provide both an important phase for the development of health behaviours and skills of the child as well as a time in which parents respond to health issues with particular sensitivity and interest. This chance for health communication should be used to counteract health inequalities particularly with socio-economically disadvantaged groups.

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## Conflict of Interest

The authors declare no conflict of interest.

## Dr. Elisabeth Höld<sup>1, 2</sup>

Mag. Ariane Hitthaller MSc.<sup>3,4</sup>

- Mag. Petra Ruso<sup>3, 5</sup> Alexandra Kolm MSc.<sup>1, 6</sup>
- <sup>1</sup>Fachhochschule St. Pölten GmbH
- Studiengang Diätologie
- Matthias-Corvinus-Str. 15, A-3100 St. Pölten
- <sup>2</sup> E-Mail: elisabeth.hoeld@fhstp.ac.at <sup>3</sup> Arbeitsgemeinschaft Gesundheitsförderung ARGEF GmbH
- Grazer Str. 71, A-2700 Wiener Neustadt
- <sup>4</sup>E-Mail: office@hitthaller.com
- <sup>5</sup>E-Mail: petra.ruso@argef.at
- <sup>6</sup>E-Mail: alexandra.kolm@fhstp.ac.at

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