The Open Access Journal of Science and Technology
Vol. 2 (2014), Article ID 101020, 6 pages
doi:10.11131/2014/101020

AgiAl Publishing House
http://www.agialpress.com/

Research Article

Postpartum Nutrient Intakes and Beverage Patterns of American Indian Women

Teresa A. Marshall[1], Katherine W. O. Kramer[2], Brenna C. McMahon[3], Delores E. Starr[4], Kathy R. Phipps[5], John J. Warren[1], Deborah V. Dawson[2], and David R. Drake[2]

[1]*Department of Preventive and Community Dentistry, University of Iowa, Iowa City IA, USA*
[2]*Dows Institute for Dental Research, University of Iowa, Iowa City, IA, USA*
[3]*University of Wisconsin Hospital & Clinics, Madison, WI, USA*
[4]*Indian Health Service, Pine Ridge, SD, USA*
[5]*Oral Health Surveillance Consultant, Morro Bay, CA, USA*

*Corresponding Author: Teresa A. Marshall; email: teresa-marshall@uiowa.edu

Received 14 August 2013; Accepted 17 April 2014

Academic Editor: Gustavo Pimentel

Abstract. Objectives: American Indian (AI) children are at risk for chronic diseases associated with marginal early nutrition environments. We describe nutrient intakes and beverage patterns of AI women during the early postnatal period to identify nutritional adequacy and beverage habits. Methods: 24 hour recalls and beverage frequency questionnaires were administered to AI mothers ($n = 239$) from a Northern Plains Tribal community 1 month postpartum. 24 hour recalls were analyzed using Nutritionist PRO(R) software, and intakes were compared to Estimated Average Requirements (EAR). Results: The percentage of AI women reporting nutrient intakes below the EAR was 97% for vitamin D, 96% for vitamin E, 69% for vitamin A, 55% for vitamin C, 73% for calcium and 79% for magnesium. Median (25th, 75th percentile) beverage intakes reported by beverage consumers were 8.0(4.0, 16.0) oz milk, 8.0(3.4, 16.0) oz 100% juice, 8.0(4.0, 16.0) oz juice drinks, 18.6(7.4, 28.0) oz regular pop, 9.1(4.6, 18.3)oz sports drinks, 12.0(5.1, 22.0)oz sugared flavored water and 48.0(24.0, 96.0) oz water. Conclusions: The low nutrient and high sugared beverage intakes increased risk of chronic malnutrition. The nutritional environment predisposes AI children to chronic diseases including obesity and dental caries through early metabolic programming and later modeling behaviors.

Keywords: Nutrient intake, beverage intake, American Indian, postpartum women, nutritional adequacy

1. Introduction

Dietary behaviors are a common denominator for both obesity and dental caries, which are chronic diseases particularly prevalent in American Indian (AI) children [1, 2]. Obesity is defined as having excess body fat, and predisposes one to multiple comorbid conditions including type 2 diabetes, cardiovascular disease, hypertension, osteoarthritis and sleep apnea. Dental caries is defined as the process during which oral bacteria produce acid which destroys the enamel. While obesity is associated with excessive intake of energy from carbohydrate, protein, fat or alcohol, caries are associated with excessive exposure to fermentable carbohydrates. Highly processed foods and dietary behaviors that encourage frequent, prolonged eating have been associated with both obesity and caries.

Unfortunately, both disease processes are much more complex than is often suggested by the emphasis on excessive energy intake and eating frequency. Obesity has long been known to have a strong genetic predisposition with multiple environmental risk factors. Caries have historically been associated with environmental risk factors including oral hygiene and fluoride exposure; the genetic predisposition to caries is beginning to be explored. Furthermore, dietary influences, previously simplified to current eating practices, are now being explored as lifelong processes. Early nutrient exposure is thought to set the stage for subsequent disease risk through metabolic programming and tissue development [3, 4]. In utero and early post-natal malnutrition is a risk factor for adult obesity and cardiovascular disease, while micronutrient deficiencies during tooth development are a risk factor for enamel hypoplasia which could increase susceptibility to caries [3–6]. Furthermore, Schroth et al. reported that children with severe early childhood caries had lower serum vitamin D and higher parathyroid hormone levels than children without caries [6].

Obesity and caries are each associated with low socioeconomic status; the relationship between socioeconomic status and access to adequate nutritional resources is called food security [7–9]. Early food insecurity has been associated with increased risk of poor oral health, increased hospitalizations, developmental concerns and obesity [10–13]. Diets of children from very low food secure households are often high in total energy, fat and added sugars and characterized by high sugared beverage intakes [14, 15].

AI children have disproportionally high burdens of both obesity and caries, and little data are available on their early nutrition environments. Modeling of diets that provide inadequate nutrient intakes and/or beverages associated with caries during infancy could increase risk of obesity and caries in later childhood. The purpose of the present paper is to describe nutrient intakes and beverage patterns of AI women during the early postnatal period to identify nutritional adequacy and beverage habits.

2. Methods

2.1. Subjects. Mothers ($n = 239$) of newborn children living in a Northern Plains Tribal community were recruited for participation in a longitudinal investigation of early childhood caries with emphasis on transmission of cariogenic bacteria from mother to child [16]. The study was approved by the University of Iowa's Institutional Review Board, the Aberdeen Area Indian Health Service's Institutional Review Board and the Tribal Research Review Board.

2.2. Data collection. Baseline data including demographic, mothers' dietary and other caries-related variables were collected through interviews by study research assistants and exams by dental hygienists during in-home visits when the child was approximately one month of age (± 30 days). A dietary manual was developed to train research assistants to conduct 24 hour recalls and query dietary practices. The 24 hour recalls were analyzed by a registered dietitian using Nutritionist PRO(R) software, and nutrient intakes were compared to age and gender specific Estimated Average Requirements (EAR), the Dietary Recommended Intake (DRI) that defines the nutrient intake necessary to meet 50% of a population's needs, and Adequate Intakes (AI), the DRI that defines the nutrient intake meeting 100% of the population's needs [17, 18]. A beverage intake questionnaire was used to ascertain frequencies and quantities of beverage consumption. Alcohol intake was not assessed due to sensitivity of alcohol use and the alcohol free nature of the community.

2.3. Statistical analyses. Statistical analyses were performed using SAS (Version 9.3, SAS Institute, Cary NC). Descriptive statistics are presented for demographic, nutrient and beverage intakes.

3. Results

The women in this study were 23.7 ± 5.6 years of age (mean ± standard deviation) and living in households with 7.0 ± 2.8 members at enrollment. The majority of women self-identified as AI alone. Most women had a high school education or less with few graduating from college. Of those reporting household income, most reported incomes less than $10,000. Specific demographic characteristics are provided in Table 1.

Women's 24 hour-recall reported nutrient intakes and the percentage of women whose nutrient intakes were below their age-specific EARs are listed in Table 2. More than 90% of women reported nutrient intakes below the EAR for vitamin D and vitamin E, while over 50% reported intakes below the EAR for vitamin A, vitamin C, calcium and magnesium. Median (25^{th}, 75^{th} percentiles) fiber intakes of 13 (8, 18) g were below the AI of 25 g. The median (25^{th}, 75^{th} percentiles) total sugar intakes were 78 (40, 123) g; the relative distribution of natural and added sugars is unknown.

More women reported consumption of water or sugared beverages than of flavored sugar-free beverages (Table 3). Water, 100% juice and regular pop were consumed by over 80% of women, while milk and reconstituted powdered beverages were consumed by over half of women. Of those reporting consumption, median intakes were highest for water (48 oz), followed by regular pop (19 oz), milk (8 oz), 100% juice (8 oz) and reconstituted sugared beverages (8 oz). The most commonly consumed beverages at meals were water (36%) and regular pop or other sugared beverages (33%), with water (47%) and regular pop or other sugared beverages (29%) also being the most commonly consumed beverages between meals.

Table 1: AI women's (n = 239) demographic characteristics at enrollment

	Frequency	%
Race/Ethnicity		
Not American Indian	1	0.4
American Indian + one or more other race/ethnicity	14	5.9
American Indian alone	224	93.7
Education Level		
≤ 8^{th} grade	9	3.8
Some high school	98	41.0
High school diploma or GED	49	20.5
Some college	71	29.7
2 year college	7	2.9
≤ 4 year college	5	2.1
Household Income		
≤ $10,000	95	39.8
$10,001 - $20,000	21	8.8
$20,001 - $30,000	26	10.9
$30,001 - $40,000	17	7.1
> $40,001	11	4.6
Unknown/Refused	69	28.9

Table 2: Median (25^{th}, 75^{th} %) daily nutrient intakes of AI women (n = 239) calculated from 24 hour recalls compared to age specific Estimated Average Requirements (EAR).

Nutrient	Median (25^{th}, 75^{th}%) Intake	EAR[1]	% below EAR level[2]
Kcal (kcal)	1875 (1436, 2438)		
Carbohydrate (g)	219 (153, 296)	100	9.2
Fat (g)	76 (50, 104)		
Dietary Fiber (g)	13 (8, 18)		
Total Sugar (g)	78 (40, 123)		
Protein (g)[3]	79 (53, 109)	99	16.8
Vitamin A (ug RE)[4]	331 (172, 552)	500	68.5
Vitamin C (mg)	49 (20, 127)	60	54.6
Vitamin D (μg)	1.6 (0.3, 3.7)	10	97.1
Vitamin E (mg)	2.0 (0.4, 4.7)	12	95.8
Thiamin (mg)	1.4 (0.9, 1.9)	0.9	24.4
Riboflavin (mg)	1.6 (1.0, 2.4)	0.9	21.4
Niacin (mg)	20 (12, 28)	11	20.6
B6 (mg)	1.5 (0.9, 2.3)	1.1	33.6
Folate (μg DFE)	383 (201, 618)	320	40.8
B12 (μg)	4.4 (2.1, 7.7)	2.0	23.5
Calcium (mg)	518 (328, 840)	800	72.7
Iron (mg)	14 (11, 21)	8.1	13.9
Magnesium (mg)	181 (119, 252)	255	79.0
Zinc (mg)	11 (6, 17)	6.8	29.0

[1]EAR for 19-30 year old females.

[2]Percentage of AI women not meeting age and gender specific EAR.

[3](Protein EAR) is calculated for 150 lb female (0.66g/kg/d).

[4]Vitamin A's EAR value is expressed in RAE; Nutritionist Pro quantifies RE.

Table 3: Percent of AI women ($n = 239$) consuming beverages weekly, and median (25^{th}, 75^{th} %) daily intakes of consumers calculated from 24 hour recalls.

Beverage	% Consumers	Median (25^{th}, 75^{th}%) intake Consumers
Cow's milk	65.3	8.0 (4.0, 16.0)
Milk based beverages	6.3	3.0 (1.7, 8.0)
100% Juice	82.4	8.0 (3.4, 16.0)
Juice drinks	33.1	8.0 (4.0, 16.0)
Regular pop	82.0	18.6 (7.4, 28.0)
Sports drinks	36.4	9.1 (4.6, 18.3)
Energy drinks	5.9	4.9 (2.9, 11.4)
Reconstituted sugared beverages	58.6	8.0 (3.4, 16.0)
Flavored water	5.0	12.0 (5.1, 22.0)
Other sugared beverages	51.5	8.0 (4.0, 16.0)
Water	98.7	48.0 (24.0, 96.0)
Diet pop	13.0	5.1 (3.4, 12.0)
Reconstituted sugar-free beverages	5.9	5.9 (3.4, 8.0)
Other sugar-free beverages	15.9	8.0 (3.4, 12.0)

4. Discussion

Analyses of 24 hour recalls reported by AI women during the postnatal period suggest that their nutrient intakes are not consistent with EAR guidelines for adult women. The EAR is defined as the nutrient intake meeting 50% of a healthy population's requirements, and is used to identify nutritional adequacy [17]. An individual whose usual intake is less than the EAR is defined as having an inadequate intake. Using these criteria, the diets of AI women are not meeting their nutritional needs and place them at risk for nutrient deficiency related diseases.

Reported energy intakes are within normal ranges for adult women suggesting that inadequate nutrient intakes are associated with food choices rather than inadequate food consumption. Nutrients associated with grains (i.e., thiamin, niacin, riboflavin) and meats (i.e., protein, iron and zinc) were least likely to be deficient, while nutrients associated with dairy foods (i.e., calcium, vitamin D, and vitamin A) and fruits or vegetables (i.e., fiber, vitamin C, and folate) were more likely to be deficient. Low intakes of dairy products, fruits and vegetables have been reported previously amongst AI populations [19], and low intakes are certainly not unique to this population [20, 21]. Ta et al. assessed fruit and vegetable intakes of adults living in Washington State as part of a cardiovascular risk factor study, and reported that approximately 22%, 15% and 6% of adults met the 2005 USDA Dietary Guidelines for fruits, vegetables or both fruits and vegetables, respectively [20]. Similarly Lutfiyya et al. reported that 79% of rural and 75% of non-rural adults participating in the 2009 Behavioral Risk Factor Surveillance Study failed to consume the recommended 5 servings of fruits and/or vegetables [21].

Low household incomes, particularly for the household size, were reported by AI women participating in this study. Although we did not assess food security, food insecurity is associated with the presence of children, low socioeconomic status, and black or Hispanic identity, and has previously been reported in AI populations [22–26]. According to the USDA, the geographical area studied is considered a food desert with 100% of residents having low food access [23]. With limited access to food stores and limited financial resources, which impact transportation to access food as well as purchasing power, the observed inadequate nutrient intakes are not surprising. Bauer et al. reported that AI children from very low food secure homes had more household barriers to healthy food consumption and consumed more foods from convenience stores than their food secure peers [24]. Mullany et al. reported that high food costs and transportation barriers increased the risk of food insecurity in AI families [25].

Over 50% of AI women participating in this study reported weekly consumption of regular pop, reconstituted powdered sugared beverages, 100% juice and other sugared beverages. Recommendations for sugared beverage intakes are limited, and generally suggest that sugared beverage, including 100% juice, intakes be decreased or limited to 8 oz per day [27, 28]. Total daily sugared beverage intakes reported by AI consumers were high relative to suggested intakes for added sugars. According to the United States Department of Agriculture's MyPlate Guidelines, recommended empty calorie intakes (i.e., calories from solid fats and added sugars) for adult women with low activity levels range from 160–260 kcal [29]. Eight ounces of regular pop, reconstituted powdered sugared beverages and 100% juice contain 100, 110, and 130 kcal, respectively. Many AI women participating in

this study who consume these beverages are exceeding these guidelines; again, these data are consistent with reported intakes from other populations [14, 15, 30].

We do not know if or how the diets of AI women might have changed since childbirth as our data were collected 1 month postpartum. However, the reported intakes are not consistent with adequate nutrition for optimal fetal development, nor are AI women modeling nutritionally healthy diets for their children. Most women are prescribed prenatal vitamins during pregnancy which, if consumed, would ensure adequate nutrient intake for fetal development. Should the dietary intakes reported 1 month postpartum reflect food insecurity and/or lack of access to healthy diets, one could assume that food nutrient intakes during pregnancy were not ideal. Prenatal, perinatal or postnatal malnutrition is considered a risk factor for subsequent chronic disease, including obesity and enamel hypoplasia associated dental caries [3–5]. Regardless of the in utero environment, modeling of dietary behaviors that provide inadequate nutrient and high sugared beverages intakes places the AI child at risk for both obesity and dental caries.

Self-reported dietary intakes are limited by the respondent's memory, willingness to divulge true behaviors and biased recall. A single 24 hour recall, which is a poor estimate of individual intake, was used to collect intake data in this study; multiple 24 hour recalls are preferred to identify usual nutrient intakes. A beverage frequency intake was used to quantify usual beverage intakes. Interview administered recalls and frequencies do not require literacy, have limit impact on food choices and have minimal response burden. Participants are aware that the current study is focused on oral health, and knowledge of associations between sugared beverage intakes and caries might have encouraged underreporting of sugared beverage intakes and exaggeration of sugar-free beverage intakes.

The low nutrient and high sugared beverage intakes reported by AI women are not uncommon for individuals with socioeconomic, racial and ethnic disparities. The reported intakes increase risk of chronic malnutrition which predisposes the women to chronic disease and early mortality. Furthermore, through early metabolic programming and later modeling behaviors, the nutritional environment predisposes the AI children to chronic diseases including obesity and dental caries.

Acknowledgements

This study was funded by NIH Grant RO1 DE017736. None of the authors have a conflict of interest.

References

[1] A. E. Weedn, S. C. Ang, C. L. Zeman, and P. M. Darden, Obesity prevalence in low-income preschool children in Oklahoma, *Clinical Pediatrics*, **51**, no. 10, 917–922, (2012).

[2] W. J. Psoter, D. G. Pendrys, D. E. Morse, H. Zhang, and S. T. Mayne, Associations of ethnicity/race and socioeconomic status with early childhood caries patterns, *Journal of Public Health Dentistry*, **66**, no. 1, 23–29, (2006).

[3] J. S. Dyer and C. R. Rosenfeld, Metabolic imprinting by prenatal, perinatal, and postnatal overnutrition: a review, *Seminars in Reproductive Medicine*, **29**, no. 3, 266–276, (2011).

[4] B. Koletzko, B. Brands, L. Poston, K. Godfrey, and H. Demmelmair, Early nutrition programming of long-term health, *The Proceedings of the Nutrition Society*, **71**, no. 3, 371–378, (2012).

[5] P. W. Caufield, Y. Li, and T. G. Bromage, Hypoplasia-associated severe early childhood caries–a proposed definition, *Journal of Dental Research*, **91**, no. 6, 544–550, (2012).

[6] R. J. Schroth, N. S. Jeal, E. Kliewer, and E. A. Sellers, The relationship between vitamin D and severe early childhood caries: a pilot study, *International Journal for Vitamin and Nutrition Research. Internationale Zeitschrift für Vitamin- und Ernährungsforschung. Journal international de vitaminologie et de nutrition*, **82**, no. 1, 53–62, (2012).

[7] T. D. Brisbois, A. P. Farmer, and L. J. McCargar, Early markers of adult obesity: a review, *Obesity Reviews: an official journal of the International Association for the Study of Obesity*, **13**, no. 4, 347–367, (2012).

[8] L. M. Rossen and K. C. Schoendorf, Measuring health disparities: trends in racial-ethnic and socioeconomic disparities in obesity among 2- to 18-year old youth in the United States, 2001-2010, *Annals of Epidemiology*, **22**, no. 10, 698–704, (2012).

[9] L. N. Borrell and M. Talih, A symmetrized Theil index measure of health disparities: An example using dental caries in U.S. children and adolescents, *Statistics in Medicine*, **30**, no. 3, 277–290, (2011).

[10] M. A. da Fonseca, The effects of poverty on children's development and oral health, *Pediatric Dentistry*, **34**, no. 1, 32–38, (2012).

[11] J. T. Cook, D. A. Frank, C. Berkowitz, M. M. Black, P. H. Casey, D. B. Cutts, A. F. Meyers, N. Zaldivar, A. Skalicky, S. Levenson, T. Heeren, and M. Nord, Food insecurity is associated with adverse health outcomes among human infants and toddlers, *The Journal of Nutrition*, **134**, no. 6, 1432–1438, (2004).

[12] J. T. Cook, D. A. Frank, P. H. Casey, R. Rose-Jacobs, M. M. Black, M. Chilton, S. Ettinger de Cuba, D. Appugliese, S. Coleman, T. Heeren, C. Berkowitz, and D. B. Cutts, A brief indicator of household energy security: associations with food security, child health, and child development in US infants and toddlers, *Pediatrics*, **122**, no. 4, 867–875, (2008).

[13] R. S. Gross, A. L. Mendelsohn, A. H. Fierman, A. D. Racine, and M. J. Messito, Food insecurity and obesogenic maternal infant feeding styles and practices in low-income families, *Pediatrics*, **130**, no. 2, 254–261, (2012).

[14] J. R. Sharkey, C. Nalty, C. M. Johnson, and W. R. Dean, Children's very low food security is associated with increased dietary intakes in energy, fat, and added sugar among Mexican-origin children (6-11 y) in Texas border Colonias, *BMC Pediatrics*, **12**, p. 16, (2012).

[15] C. A. Pinard, B. M. Davy, and P. A. Estabrooks, Beverage intake in low-income parent-child dyads, *Eating Behaviors*, **12**, no. 4, 313–316, (2011).

[16] J. J. Warren, K. W. Kramer, K. Phipps, D. Starr, D. V. Dawson, T. Marshall, and D. Drake, Dental caries in a cohort of very

young American Indian children, *Journal of Public Health Dentistry*, **72**, no. 4, 265–268, (2012).

[17] Dietary Reference Intakes: Applications in Dietary Assessment, (2000), Available at: http://fnic.nal.usda.gov/dietary-guidance/dri-reports/applications-dietary-assessment#overlay-context=dietary-guidance/dietary-reference-intakes/dri-reports. Accessed 10/23/12.

[18] Dietary Reference Intakes: Recommended Intakes for Individuals, (2010), Available at: http://www.iom.edu/ Activities/Nutrition/SummaryDRIs/~/media/Files/Activity%20Files/Nutrition/DRIs/5_Summary%20Table%20Tables%201-4.pdf. Accessed 10/23/12.

[19] M. K. Fialkowski, M. A. McCrory, S. M. Roberts, J. K. Tracy, L. M. Grattan, and C. J. Boushey, Estimated nutrient intakes from food generally do not meet dietary reference intakes among adult members of Pacific Northwest tribal nations, *The Journal of Nutrition*, **140**, no. 5, 992–998, (2010).

[20] M. L. Ta, J. VanEenwyk, and L. Bensley, Limited percentages of adults in Washington State meet the Dietary Guidelines for Americans recommended intakes of fruits and vegetables, *Journal of the Academy of Nutrition and Dietetics*, **112**, no. 5, 699–704, (2012).

[21] M. N. Lutfiyya, L. F. Chang, and M. S. Lipsky, A cross-sectional study of US rural adults' consumption of fruits and vegetables: do they consume at least five servings daily? *BMC Public Health*, **12**, p. 280, (2012).

[22] J. R. Sharkey, C. M. Johnson, and W. R. Dean, Less-healthy eating behaviors have a greater association with a high level of sugar-sweetened beverage consumption among rural adults than among urban adults, *Food S Nutrition Research*, **55**, 1051–1055, (2011).

[23] Available at: http://www.ers.usda.gov/data-products/food-desert-locator/go-to-the-locator.aspx. (2012) Accessed 10/23/12.

[24] K. W. Bauer, R. Widome, J. H. Himes, M. Smyth, B. H. Rock, P. J. Hannan, and M. Story, High food insecurity and its correlates among families living on a rural American Indian Reservation, *American Journal of Public Health*, **102**, no. 7, 1346–1352, (2012).

[25] B. Mullany, N. Neault, D. Tsingine, J. Powers, V. Lovat, L. Clitso, S. Massey, A. Talgo, K. Speakman, and A. Barlow, Food insecurity and household eating patterns among vulnerable American-Indian families: associations with caregiver and food consumption characteristics, *Public Health Nutrition*, **16**, no. 4, 752–760, (2012).

[26] G. M. Egeland, L. Johnson-Down, Z. R. Cao, N. Sheikh, and H. Weiler, Food insecurity and nutrition transition combine to affect nutrient intakes in Canadian arctic communities, *The Journal of Nutrition*, **141**, no. 9, 1746–1753, (2011).

[27] Dietary Guidelines for Americans, U.S. Government Printing Office, Washington, DC, 7th edition, 2010, Available at: http://www.cnpp.usda.gov/Publications/DietaryGuidelines/2010/PolicyDoc/PolicyDoc.pdf. Accessed 10/23/12.

[28] B. M. Popkin, L. E. Armstrong, G. M. Bray, B. Caballero, B. Frei, and W. C. Willett, A new proposed guidance system for beverage consumption in the United States, *American Journal of Clinical Nutrition*, **83**, no. 3, 529–542, (2006).

[29] ChooseMyPlate. (2012) Available at: http://www.choosemyplate.gov/. Accessed: 10/23/12.

[30] J. D. Supplee, G. E. Duncan, B. Bruemmer, J. Goldberg, Y. Wen, and J. A. Henderson, Soda intake and osteoporosis risk in postmenopausal American-Indian women, *Public Health Nutrition*, **14**, no. 11, 1900–1906, (2011).

AGIAL PUBLISHING HOUSE

Nuclear Receptor Research

Dear Colleagues,

Although publications covering various aspects of nuclear receptors (NRs) appear every year in high impact journals, these publications are virtually buried among an overwhelming volume of articles that are only peripherally related to NRs. The latter fact prompted a group of prominent scientists active in the field of nuclear receptor research to conclude that gathering publications on this superfamily of receptors under one umbrella would provide an invaluable resource for a broad assemblage of scientists in the field; thus the idea for a new journal, **Nuclear Receptor Research**, was born.

I am pleased to share with you that **Nuclear Receptor Research** is now a reality as an open access peer-reviewed journal devoted to publishing high-quality, original research and review articles covering all aspects of basic and clinical investigations involving members of the nuclear receptor superfamily. **Nuclear Receptor Research** has an editorial board comprised of a group of renowned scientists from around the world. Board members are committed to make **Nuclear Receptor Research** a vibrant forum showcasing global efforts in this ever-expanding area of research.

We believe that the impact and visibility of papers related to nuclear receptors will be significantly enhanced by appearing in a journal devoted exclusively to nuclear receptors. In addition, it is hoped that **Nuclear Receptor Research** will serve as a catalyst to encourage collaborative studies as well as to foster interdisciplinary initiatives within this expansive and dynamic field. For these reasons, I invite you to consider **Nuclear Receptor Research** (**http://www.agialpress.com/journals/nrr/**) as a vehicle to share your novel research findings as well as your vision for the future of nuclear receptor research with your colleagues around the world.

Mostafa Badr
Editor-in-Chief
Nuclear Receptor Research