Introduction

The problems that lead to homelessness and those that maintain homelessness are complicated and variable. Family illness, loss of employment, lack of a safety net, mental illness, substance abuse, physical abuse and many other variables are all part of the myriad of possibilities that may lead to the streets. Various arguments have in turn blamed anything from individual deficiencies to global economics. Without a doubt, substance abuse and mental illness are more prevalent in homeless populations than in those housed; although, it is difficult to ascertain whether depression or substance abuse predate or are a condition of being homeless (1). Further complicating matters is that regional differences in resource allocation and service provision make it difficult to generalize any research to "the homeless" at large. Indeed, homelessness is as elusive in response and definition as it is in cause; however, while other factors remain variable, the effects of homelessness do not-the longer someone spends on the streets, the greater their decline in general health status becomes (2,3).

With limited national resources directed towards the homeless and pervasive distrust and underutilization of those resources, the problem of health status decline seems to be unavoidable. While private agencies have attempted to fill the gap of food and service provision, it may be argued that these private programs merely maintain homelessness without addressing its structural roots. However, with or without a national plan, people still need to meet their needs. Neither suggesting that homelessness can be solved locally, nor that local programs are ineffective at addressing homelessness, this paper seeks to identify policies and programs that may augment current programs to improve both the quality and humanity of care provision.

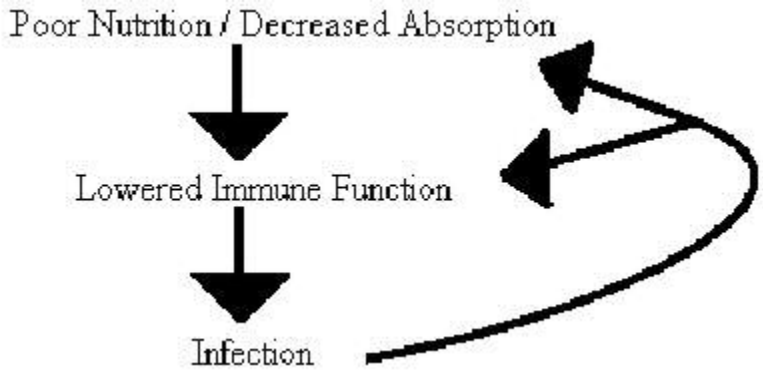
Why Nutritional Status?

Studies in the past that assessed malnutrition in low-income or homeless populations found an intriguing paradox. Rather than finding positive correlation between income and weight, the opposite was found (4,5). The solution to the riddle lies in the patterns of food scarcity and the development of binging-type eating behaviors (5). Such was the case in many of those interviewed for this project, though none exemplify it quite as well as one 44-year-old, homeless woman, who at the time of interview was eating from a professional-size aluminum tray filled with approximately four pounds of chicken feet. She had never eaten chicken feet before, but as she said, "That's what they gave me." With limited access to both money to buy food and the means in which to prepare food, many homeless face the ultimate form of food insecurity-alternating periods of starvation and gluttony. Conventional methods of malnutrition sampling are therefore ill advised, as the weight of an individual does not supply any information on the quality of their diet. Hence the concept of nutritional status is more applicable.

Nutritional status can be broken into four components (6).

· Safe and clean water source · Available and adequate food source · Basic health care · Nutritional literacy

Changes in nutritional status have profound effects on all individuals, housed and otherwise; however, when economic, medical, and social support systems fail, as they have in the case of homeless individuals, the effects of poor nutrition are magnified and a self-repeating chain of effect is observed (7).



Exposure to the elements and high prevalence of chronic diseases may further lower immune function (8). In addition, with limited access to primary care, many homeless people are forced to let minor diseases remain untreated until emergency care is needed. Nutritional status can therefore be thought as both a proxy for health status and as a point of entry for intervention. As information on nutrition can be disseminated at the level of food provision and case management, it may be possible to implement "upstream" policies that may prevent some of the disease load and may increase willingness to utilize existing programs. For the sake of brevity, the issues surrounding water quality, hygiene availability and basic health care provision will not be discussed in this paper. While these issues are of vital importance they are unable to fit within the scope of the current project.

Methods

Twenty-one people were approached for interviews. Three declined and eighteen were interviewed at four different zones in Santa Monica: OPCC (Ocean Park Community Center), City Hall, 7th and Wilshire, 5th and Broadway. Interviews lasted from six to ninety minutes. Each person was asked for a 24-hour recall of all ingested items. Three items were asked on nutritional literacy, and two items were asked on frequency and adequacy of intake, one item was asked on food budget and breakdown of supplemental purchases, and the final question was a qualitative, open-ended item on what they would change in their diet. The three people who declined to participate would not comment on their reluctance. Five people duplicated responses of those interviewed in their immediate proximity, indicating that a better method of conducting interviews may be required in the future. Nutritional analysis and basic nutrition counseling were offered to all those who participated, and all those approached were compensated with Slim Fast shakes and cereal boxes or cereal bars based on preference. Slim Fast shakes were used due to high vitamin content and relatively low expense to the investigator. The results were analyzed using the Nutritionist 4 application. The full results were stratified into an alcohol, non-alcohol, and total population groups. While all qualitative data was kept, those who stated that their previous day's intake was unusual (1 person), and the upper and lower extremes were discarded for purpose of quantifying data.

Intake

There are three main factors in addressing dietary intake: source, frequency, and quality. Nationally, soup kitchens are the most common (63%) reported site of meals, and locally 53% of homeless adults in Los Angeles reported that they had used a soupline within the past week (9,10). However, potential bias cannot be overlooked. Convenience samples, or sites that exist alongside of service providers, exclude those who do not utilize the services at the site(s) in question; therefore, the utilization of soup kitchens may be over represented in some studies, and the use of other sources may be under represented. Other sources may include fast food restaurants, shelters, grocery stores, restaurant leftovers, trashcans, relatives, and food pantries (3,10). Across studies the number of reported meals per day varies from approximately 1.4 to 1.9 (3, 9-11). Nationally most soup kitchens only provide one meal a day (9). and despite a relative abundance of meal sites in Santa Monica, the overlap of meal service times and the distance between service sites may limit the real number of possible meals. This number correlated to the intakes of the respondents, though no direct item on number for meals was asked. The average days per week that someone did not get enough to eat was 2 (range 0-7).

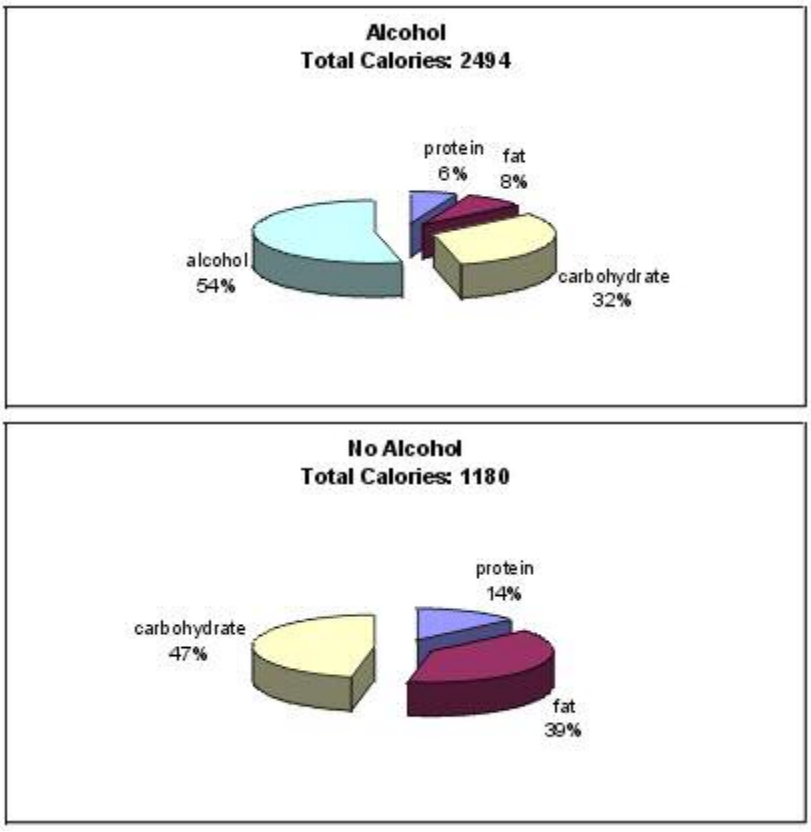
Individual variance in dietary intake relates to several risk factors, namely stereotyped "homeless" appearance, known sites of food distribution, substance abuse, mental illness, dual diagnosis, and chronic illness (10). Various studies have reported wide ranges of inadequate intake (as defined as less than 2/3 of the RDA) (3,11). However, averages can be misleading especially in undernourished populations, as value ranges are skewed due to the inclusion of zero level intakes in many subjects. The usefulness of this data is questionable, and indicates that more individualized interventions must be established. Caloric intake is also problematic due to the overrepresentation of alcohol in some individuals' diets, and is therefore worthy of further investigation.

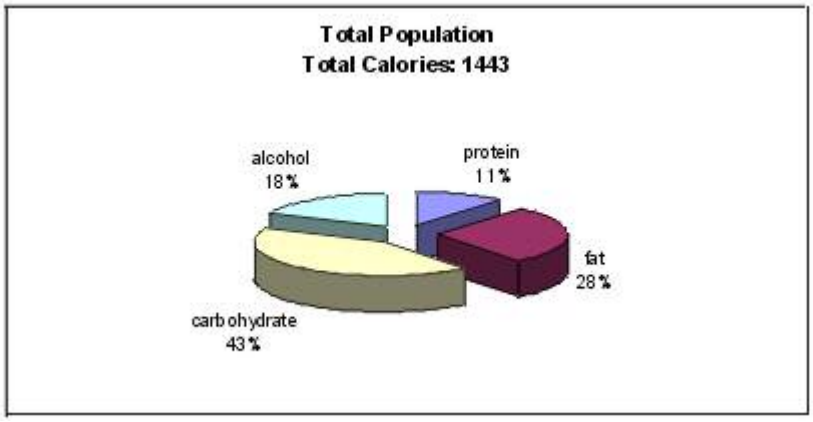
Half the homeless population drinks alcohol, and of those, nearly one half, or one-quarter of the total population are classified as problem drinkers (3,12). In the small sample of homeless persons in Santa

Monica it was necessary to stratify out an alcohol population as individuals who drank had alcohol account for 39-74% (53% average) of their caloric intake. Alcohol is an extremely efficient, yet "empty," energy source providing 7.1 calories per gram; however, the metabolism of alcohol decreases the body's ability to process other energy sources such as carbohydrates (13). Furthermore alcohol induces cytochrome p450 complexes that are responsible for the metabolic processing of many medications, i.e. acetaminophen toxicity and liver failure. The "empty" calories of alcohol may mask the signs of undernutrition until the body's ability to absorb quality nutrients is severely diminished or serious liver damaged occurs. As an aside, several of the alcohol drinkers desired a recovery program but for whatever reasons were unable to find one to meet their needs.

It is important to note that even though only 33% of those involved in the study consumed alcohol, their disproportionate consumption skewed the total population intake to include an alcohol-related caloric value of 18%.

Figure 1: Caloric Breakdown





Overall caloric intake was moderate with a wide range mostly accounting for the addition of alcohol, and several extremely low levels of intake. Vitamin deficiencies (less than 2/3 of RDA) were noted in vitamin A, thiamin, riboflavin, niacin, pyridoxine, vitamin E, biotin, vitamin D, and pant. acid. Mineral deficiencies were recorded in iron, calcium, magnesium, zinc, copper, manganese, selenium, fluoride, chromium, and molybdenum.

Vitamins	**Goal (RDA)**	No EtOH	EtOH	**Total Population**
Vitamin A	1000.0RE	48%	38%	46%
Thiamin B1	1.5mg	55%	49%	53%
Riboflavin B2	1.7mg	51%	67%	54%
Niacin B3	19.0mg	53%	101%	63%
Pyridoxine B6	2.0mg	39%	83%	47%
Folate	200.0Ug	80%	120%	88%
Cobalamin B12	2.0ug	94%	95%	94%
Vitamin E	-mg	20%	5%	17%
A-Tocopherol	1.0mg	233%	25%	192%
Pant. Acid	5.5mg	41%	44%	41%
Biotin	65.0Ug	11%	5%	10%
Vitamin C	60.0mg	187%	118%	173%
Vitamin D	5.0Ug	7%	16%	8%
Vitamin K	80.0Ug	112%	9%	91%

Minerals	**Goal (RDA)**	**No EtOH**	**EtOH**	**Total Population**
Sodium	2400.0mg	92%	75%	88%
Potassium	2000.0mg	68%	65%	67%
Iron	10mg	64%	49%	61%
Calcium	800mg	43%	49%	44%
Magnesium	350mg	37%	64%	42%
Phosphorus	800mg	63%	80%	66%
Zinc	15.0mg	33%	21%	31%
Copper	2.2mg	25%	28%	25%
Manganese	3.5mg	27%	15%	25%

Selenium	0.070mg	27%	7%	23%
Fluoride	2750.0Ug	9%	71%	22%
Chromium	0.125mg	10%	0%	8%
Iodine	150.0Ug	-%	-%	-%
Molybdenum	163.0Ug	4%	0%	3%

Nutritional Literacy

Research on nutritional literacy is sparse at best. Given the wide variety in educational backgrounds within the local homeless population (12). a single standard of reference is inappropriate. At one point, OPCC included a low-level nutritional pamphlet in with their daily sack-lunch offering only to find their parking lot strewn with the pamphlets. While more research should be done, nearly all (70%) of the people interviewed for this paper were able to correctly identify milk as the best source of calcium and an orange as the best source of vitamin C from the choices of milk, an orange, hamburger, and chicken. Questioning about naming the basic food groups elicited a wider variety of responses, which may indicate a problem with the interviewer rather than the interviewee. Failure to correctly identify the food groups or answer the nutritional questions seemed to be correlated with mental illness, dual diagnosis, and stereotypical homeless appearance; though, again the sample size is too small to be conclusive.

The question remains whether or not nutritional literacy can make an impact in health when dietary choice is limited (8,11). It is this author's firm belief that it can and does make a positive difference. Many people did make money from panhandling that they used purchase supplemental foodstuffs. Even those who were problem drinkers considered shifting dollars from alcohol to fresh foods. With proper nutritional counseling, people may be able to better spend the money they are already using to buy food. However, the problem must be dealt on the provider end as well as that of the client to compensate for both the cost and variation required to serve satisfy special dietary needs (8).

Failings of the Current System

While 75% of food providing agencies have at least one worker with food service experience, only 17% have nutritionists or dietitians (9). What results is food that substitutes variability for bulk with starches and sugars over represented and protein, fruits and vegetables under represented. Of course, perishable items are harder to store and are not as cost effective in providing pure calories. With limited budgets and unlimited clients, it is a hard, if not impossible balance. OPCC serves over 4000 people a month with a budget of just $2700 ($1900 for food; $800 for non-food items). Relying heavily on donations of "day-old" products from Vons and without cooking facilities, it is nearly impossible to provide variety from the daily cold cut sandwich (2 slices of meat, mayonnaise, mustard, cheese on occasion) cookie, fruit drink, and occasional fruit (orange or banana) (14). OPCC provides groceries to families if they have a residence, leading non-housed clients to question why they only receive "stale sandwiches."

Like their clients, food providers may also have to reexamine how they spend their food dollars. Organizations need to sit down with one another and work together to provide greater variety and better scheduling of service provision. Ideally those organizations that only provide food should at least be aware of case management centers to get clients plugged into an ongoing system of care.

Policy Implications

While it may be financially impossible for every service agency to hire a full-time nutritionist to supervise menu planning and nutritional training, it could be possible with further research to identify more specific areas of improvement. What does need to change is the approach of case management towards the concept of nutrition. Several people that were interviewed stated that the advice they had received in the past was too "academic" and they were not made to feel that they could positively affect their outcome. When done properly, nutritional counseling results in both positive psychological and physical effects (15). Limitations do exist, and homeless people may not be able to fully adhere to standard dietary recommendations;

therefore, it is even more important for case managers to know of other food service agencies, what they provide, and to stress the appropriate use of supplemental income. In addition, it is necessary for food service providers to increase the amount of vegetables and fruits in their provisions. The positive effects of vegetables in health maintenance are well documented and their incremental cost is much less than the cost of the diseases they protect against (16). While it is best to absorb nutrients through food, until nutrient-rich foods can be distributed via existing food programs, it may be worthwhile to include supplemental vitamins to combat current vitamin and mineral deficits (3,9,11).

Ongoing case management and access to recovery programs is an essential part of health status improvement and cannot be stressed enough. Addiction is a serious disease, but one that can be managed with proper treatment. Limited space and lack of resources make some treatment options prohibitively exclusive to low-income sufferers. Additional recovery programs would drastically reduce the amount of money spent on treating the end stages of addiction.

In combination with increased voice from the community, the four components of nutritional status evaluation can serve as entry into the system of ongoing care. Through feedback from the population they serve, these organizations can become more effective at meeting needs as well as improving confidence in service provision, which in turn may increase utilization and the outcomes of existing programs. Further, by addressing nutritional literacy at the level of the individual, where knowledge varies considerably, one can better develop a plan that takes in account current substance abuse issues and individual needs. This means that multi-cultural, multi-lingual training is a necessity. Furthermore, while pamphlets with sandwiches may not work, documents which address common complaints with nutritional answers (for example: gastrointestinal upset, dehydration, immune function, etc.) as well as basic information targeted to those with low literacy skills should be made available (17). While it is important to provide basic information to everyone, it is essential to provide more comprehensive information to those who desire it.

When homeless people are treated as a herd, no good can come. People are individuals and need to be treated as such. While existing programs are supposed to address these needs through case management, their underutilization brought about by general distrust, lack of applicable information, and lack of voice of those served within the organization makes positive outcomes a near impossibility. With improved nutritional inputs that meet the needs and desires of the population, and improved nutritional counseling that relies on actual circumstances and availability rather than unreasonable expectations, both the agencies and those they serve would be aided in their joint goals.

Conclusion

Factors that often plague studies on homelessness are bias and power, and this study is no different. With such a small sample size nothing more than anecdotal information can be obtained. Furthermore, as this particular study was done in Santa Monica, it cannot be assumed that the results would be reproducible elsewhere; likewise, the results of other studies may be of little predictive value to the current study.

In terms of policy, the easy solution is to suggest that additional funds will solve nutritional problems- which very well may be necessary. However, in order to be spent wisely, current programs need to reevaluate their service provision and goals before additional funds are made available. In-depth research should continue into determining nutritional inputs, and test sites should be developed for assessing outcomes of nutritional counseling in homeless populations.

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