CHAPTER II

REVIEW OF LITERATURE

Till two decades back, drinking water was not a marketable packed product in our country. Since it was given free of cost all by nature, no one had such an idea of its marketability. Thus, the bottled water is a new product to the Indian consumers and there was no much effort taken to contribute more research in this field. On account of this fact, the researcher attempted to summarize some of the research studies undertaken in some other related study.

Brief review of the past studies related to bottled water

Bohmer H, Resch K.L. (2000)\(^1\) in their article, “Mineral water or tap water- A systematic analysis of the literature concerning the question of microbial safety”, say that based on sporadic reports of microbial contamination of mineral waters, it has been recommended that, for safety reasons, particularly immuno compromised patients should drink tap water rather than bottled mineral water. However, in terms of safety, evidence of the clinical consequences may allow a better estimate than a positive in vitro test for contamination. Therefore, they reviewed the literature on documented disease outbreaks due to contaminated mineral and tap waters. Cases of contamination of tap water were documented in nearly all countries. In 35 communications they found reports on a total of 423,000 cases of disease outbreaks due to contaminated tap water, in some cases even with lethal outcome. Main diagnosis was gastroenteritis, and main species of microorganism was crytosporidium. In contrast, there was no documented case of disease outbreak due to contaminated bottled mineral water. Tap water as well as bottled water is both supremely safe components of nutrition. The recommendation that tap water is better than mineral water, particularly for high-risk patients, is not supported by the literature.

K. Nithiyandan (2000)\textsuperscript{2} in his project work entitled, “Market status of mineral water industry with a special reference to TEAM”, reflects that consumption patterns are changing in packaged mineral water industry. Mineral water is now served on trains and aeroplanes. Besides the standard one-litre bottled water which is still the largest seller, a variety of pack sizes have been introduced. Mineral water is now available in 200ml pouch, and 500ml bottle, 1 litre and 2 litre bottle, 5 litre jar and 20 litre cane. In railway departments, trains run for two days may require about 50,000 litres of mineral water for a journey. In the modern day living, stressful working condition and demanding life style make the body lose its electrolytic balance. With companies positioning mineral water as ramification of health, it has made the market potential limitless.

G. Durai (2001)\textsuperscript{3} made an attempt to study the future prospectus of mineral water besides finding out the leading brand in Chennai city. In the case of fast moving packages, it has been revealed that one-litre bottles are more in demand accounting for 60 per cent of sales as against 10 per cent of sales of two litre bottles. The fast moving and leading brand was identified as Bisleri due to its taste and creditability of the company. He remarked that safe and reliable water distribution can no longer be taken for granted not even in the most developed countries and the consumer is quite willing to pay more for quality taking into consideration his own need, and his family health.

Catherine Ferrier (2001)\textsuperscript{4} in her discussion paper highlighted that bottled water quality is generally good, although it can suffer from the same contamination hazards as tap water. In Europe, natural mineral water quality is frequently tested, both by independent labs and by companies’ internal services. These latter controls may not be fully reliable. Yet, it is not in the interest of the companies, who base their marketing strategies on the purity of their products, to hide away occasional and traceable contamination. To make sure bottled water quality is as good as it is claimed to be, companies should release their quality tests on a day-to-day basis and make them available to a wide number of people, for instance through the internet. It is essential that

\textsuperscript{2} K. Nithiyandan, “Market status of mineral water industry with a special reference to TEAM”, MBA project report department of Management Studies, Madurai Kamarajar University, Madurai, April 2000
\textsuperscript{3} G. Durai, “Future Prospectus of Mineral Water,” MBA Project Report Submitted to Department of Management Studies, Madurai Kamarajar University, Madurai, 2001
\textsuperscript{4} Catherine Ferrier, “Bottled Water: Understanding a social phenomenon”, Discussion Paper, April 2001
consumers have access to major information, directly on the bottles’ labels, i.e., the “type” of water (natural mineral water, purified water, etc.), its mineral composition, and the location of the spring or the treatments this water might have undergone. International companies locally investing in bottled water businesses should make sure that the products are of good quality and packed in hygienic conditions, particularly in emerging and developing countries. They should also be careful to the additional pressure they put on local water resources. Solutions, e.g. re-using bottles of water in adequate sanitary conditions on a local basis, rather than just recycle or re-manufacture them into new products.

Certification of local supplies under international brand names could reduce environmental impacts due to world-wide transportation of some bottled water brands. Could the current increase in bottled water consumption threaten local water resources, in particular, in countries already facing alarming water problems (i.e. in Asia and the Pacific, where the major increase in bottled water consumption is taking place), either bottled water put an additional pressure on local water resources already under stress, or imported bottled water slightly reduces water stress.

**Benjamin Arnold and John Colford (2001)**\(^5\) conducted a systematic analysis of major impact of using mineral water. The study revealed that the purity of water did not affect the children and the product is sold so that the quantity is maintained at the standard level, so as not to affect the health of the consumer including the children. However, the study suggested that yearly follow up is essential to assess the long-term acceptability and sustainability of health impacts.

**Senthil kumar (2002)**\(^6\) in his study focused to find out the sources of awareness of consumers towards mineral water and the individual consumption of mineral water. He found that advertisement is the best source of information as all the respondents are aware of mineral water. Majority of the respondents spend up to Rs.500 per month towards mineral water, consume mineral water for the one to two years having monthly

---

5 Benjamin F.Arnold & John M.Colford, Health impact of mineral water, Division of Epidemiology, School of Public Health, University of California, April 14, 2007, pp.755-756
consumption of up to 10 litres. The packaged drinking water consumer is attracted by the benefits of easy accessibility, purity and hygiene and only a small segment of consumers have evolved to the level of being loyalists of good brand.

The packaged drinking water is now served on trains, airlines and in parties. Besides, the companies have introduced bigger pack sizes to cater to a variety of needs. Packaged drinking water is available in 1 litre, 2 litre and 500ml bottles, 20 litre cane and 200 ml packets. Bottled drinking water market in the country is poised for a quantum leap notwithstanding the stricter quality standards to be imposed by the Bureau of Indian Standards of manufacturing units.

Gary L. Geissler & John E. Gamble (2002)\(^7\) in their article made an attempt to study the bottled water industry that has experienced explosive growth during the past decade, largely due to a widely held consumer perception that bottled water is purer and healthier than tap water. Recent research raises questions about whether bottled water is actually better than tap water. Amid the controversy, there is a need to help clarify current consumer perceptions concerning water quality and purity and to examine associated new product-development implications. A product concept test, among 386 bottled water consumers is used here to provide an evaluation of a proposed bottled water brand that would be produced by a local water company. Overall, the findings indicate that the product concept is promising, but needs some refinement.

The managerial implications, particularly concerning additional purification of tap water and critical success factors, apply not only to the proposed product but also to many other entrants into the bottled water market. Ultimately, the bottled water market’s attractiveness varies, depending on the competitive capabilities of the seller. Industry competition is fierce, and successful sellers must possess core competencies related to low-cost production and packaged goods marketing. Bottled water, for the most part, is a commodity product that gains shelf space and sales through effective differentiation and image building. Retail exposure is also more easily gained by sellers that have some power in

their negotiations with retailers. Beverage buyers such as supermarkets, convenience stores, and mass merchandisers have considerable power to negotiate for the lowest price, unless the seller can offset that power with the attractiveness of their entire product line.

Peter Jaer Jensen, Jeroen Ensink, Gayathri Jayasinghe (2002) had carried out a study on domestic transmission routes of Pathogens: the problems of in-house contamination of drinking water during storage in developing countries said that even if drinking water of poor rural communities is obtained from a sage source, it can become contaminated during storage in the house. To investigate the relative importance of this domestic domain contamination, a five-week intervention study was conducted at 67 households in Punjab, Pakistan and were provided with new water storage pitcher, normally used in the area and the remaining 34 households received a narrow-necked water storage pitcher, preventing direct hand contact with the water. The result of their study showed that the domestic domain contamination with indicator bacteria is important only when the water source is relatively clean, that contains less than 100 Escherchia coli per 100 ml of water. When the number of Escherchia coli in the water source is above this value, interventions to prevent the domestic contamination would have an impact on water quality compared with public domain interventions. Although the bacteriological water quality improved, elimination of direct hand contact with the stored water inside the household could not prevent the occasional occurrence of extreme contamination values that are often thought to originate within the domestic domain have to be attributed to the public domain transmission.

H B Mathur, Sapna Johnson Rashmi Mishra, Avinash Kumar, and Bhupinder Singh (2003) in their study titled “CSE Report on pesticide residues in bottled water”, analysed pesticide residues in bottled water. Pure drinking water is a luxury in India today. Most water sources are contaminated; waterborne diseases such as diarrhoea, dysentery, typhoid, jaundice and gastroenteritis are legion. Even the municipal water supply is not free of contaminants like pesticides, and heavy metals. People either

---

8 Peter Jaer Jensen, Jeroen Ensink, Gayathri Jayasinghe, Tropical Mediane and international journal, Vol.7, issue 7, pp. 604-609, July 2002
9 Prof H B Mathur Dr Sapna Johnson Dr Rashmi Mishra, Mr Avinash Kumar Mr Bhupinder Singh CSE Report on “pesticide residues in bottled water” (Delhi region) 2003
boil water for drinking purpose or install purifiers. Of late, they have also turned to bottled water, available in the open market; this water is perceived as safe. Given the human dependence on water, they cannot afford to be careless about the kind and quality of water they drink. Various top brands like Bisleri, Kinley, etc. claims about purity of their mineral water and advertise their water, as the safest. But the source of water for different bottlers is bore-well (groundwater).

According to the BIS drinking water standards, the desirable limit for pesticides is given as “absent”. The permissible limit, in the absence of any other alternate source is given as 0.001mg/l (1μg/l). The BIS standard for packaged drinking water IS 14543:1998 and Natural Mineral Water IS: 13428:1998 covered under the relevant PFA states that pesticide residues “should be below detectable limits” when tested in accordance with the relevant methods. However, when tested for organochlorine pesticides and organophosphorus pesticides, the water, bottled by the five top brands and other less popular brands were found to be contaminated with pesticide residues.

Sunal (2003)\textsuperscript{10} in his study “A Study of Market Potential for Packaged Drinking Water in Hospital with reference to Aquafina”, focused on the market potential for packaged drinking water consumption in hospital and he concluded in his study that the untapped outlets (canteens) would also enable the company to track out the variability in the performance of the company and he also determined whether the soft drinks giants require to enter in new segments of packaged drinking water (bulk and sachets). The main issue that Pepsi was facing was that the conventional marks were getting exhausted in the midst of the cool was and new unconventional channels need to be ventured in to for the serve.

ADA Division of Communications (2003)\textsuperscript{11} in cooperation with the Journal of the American Dental Association report conveyed that the human body is made up mostly of water and depends on water to keep organs and systems functioning properly. Water regulates body temperature; helps remove waste, cushions the joints and transports

\textsuperscript{10} Sunal.C.K , “A Study of Market Potential for Packaged Drinking Water in Hospital with reference to Aquafina”, M.Phil Dissertation Submitted To Bharathiar University, Coimbatore, 2003

\textsuperscript{11} The Journal of the American Dental Association, vol. 134 no. 9 1287, ISSN:0002-8177, September 1, 2003
nutrients and oxygen to billions of cells. Increasing water intake, sometimes can help alleviate a condition called dry mouth, or xerostomia. And water that contains an adequate amount of fluoride helps prevent tooth decay and builds strong teeth. Health experts generally recommend consuming eight to 10 cups of water a day. The amount may vary based on body size, physical activity and exposure to hot weather. More health-conscious consumers are sipping bottled water. Some even forgo fluoridated tap water in their homes for costly bottled water. A recent study shows that Americans consumed more than five billion gallons of bottled water in 2000, more than double the amount from a decade earlier. Some predict that bottled water soon may become the nation’s second most popular beverage after soft drinks. If bottled water is the main source of drinking water, people could be missing the decay-preventive benefits of fluoride, a naturally occurring mineral that helps prevent tooth decay. Water fluoridation is a community health measure that is recognized widely for its role in preventing tooth decay. In areas where natural fluoride occurs in water below the optimal level, many communities add a minute amount of fluoride to the water supply to make certain that residents receive the benefits of fluoride. While the fluoride content of bottled water varies greatly, the vast majority of bottled waters do not contain optimal levels of fluoride. Some contain no fluoride. When water is treated before it is bottled, fluoride may be lost. For example, many popular brands of bottled water undergo reverse osmosis or distillation. These treatments remove all of the fluoride from the water.

A. Daarowska, A. Borcz & J. Nawrocki (2003) in their article indicated that with increased consumption of bottled water, it is necessary to pay more attention to its quality. However, the quality control system in bottled water plants tends to be focused on the microbiological safety of water. Polyethylene terephthalate) (PET) containers are today commonly used for bottling mineral water, although PET bottles can be responsible for the formation of undesirable carbonyl compounds that can migrate into its contents. Before manufacturing a bottle, the plastic has to pass through a series of processing stages. During this treatment, thermal degradation and hydrolysis can occur with the PET material.

The high temperature used in the final stage of the bottle preform production from the PET material causes thermal degradation of polymer and contributes to the formation of the high concentration of acetaldehyde in the polymer structure. The technology of PET bottle production causes thermal degradation of the polymer and this process can lead to aldehyde formation. Acetaldehyde is held in the polymer structure of bottle material and during the storage period passes from the wall into the water and into the air. The higher the level of acetaldehyde in the bottle material, the higher is the level of acetaldehyde in bottled water. There is no correlation between pH and aldehyde concentration in bottled water.

Cesare Dosi & K. William Easter (2003) in their article focused on developing the conditions for privatization of water service or for establishing water markets. It is important to guard against potential market failures. In water markets it is important to develop a non-legalistic means for making sure that water trades do not have significant third-party effects. For privatization, regulation is needed to prevent entities from taking advantage of their monopoly control over either the water supply or the distribution network. Clearly second-best issues arise if significant third-party impacts occur because of water trades or monopoly control over the distribution system. The only economically feasible competitive distribution networks are bottled water distribution systems, which are a minor (typically, a complementary) component of the whole water distribution system.

Keith J Petrie, Simon Wessely (2004) in their article, ”Bottled water exploits our worries about what affects health in the modern world”, say that bottled water is another of the modern paradoxes of health, a product born out of our success at reducing waterborne disease. In the developing world such diseases cause over two million deaths a year, most of them among children aged less than five. In these countries, adding chlorine to water is viewed as a health intervention with the potential to save a huge number of lives. In the developed world, bottled water owes part of its popularity to the

---


14 Keith J Petrie, Simon Wessely, ”Bottled water exploits our worries about what affects health in the modern world”, BMJ, V.329(7480);, BMJ Publishing Group Ltd., Dec 18, 2004
view that tap water is impure, contaminated, and hence risky. Bottled water is seen as natural, clean, fat-free, and with traces of health giving minerals. In fact, tap water is as safe as bottled water and about 1000 times cheaper. The marketing of bottled water exploits people's worries about what affects their health in the modern world. There is a message in that bottle. But consumers can only take so much purity.

Kozisek (2004)\textsuperscript{15} in his study “Health risks from drinking demineralised water” points out that drinking water should contain minimum levels of certain essential minerals (and other components such as carbonates). Unfortunately, over the past two decades, little research attention has been given to the beneficial or protective effects of drinking water substances. The main focus was on contaminants and their toxicological properties. Nevertheless, some studies have attempted to define the minimum content of essential elements or TDS in drinking water, and some countries have included requirements or guidelines for select substances in their drinking water regulations. Although these are exceptional cases, the issue is relevant not only where drinking water is obtained by desalination (if not adequately re-mineralised) but also where home-treatment or central water treatment reduces the content of important minerals and low-mineral bottled water is consumed. Although drinking the potential for adverse health effects from long-term consumption of demineralised water is of interest not only in countries lacking adequate fresh water but also in countries where some types of home water treatment systems are widely used or where some types of bottled water are consumed. Many brands of bottled water are produced by demineralising fresh water and then adding minerals for desirable taste. Persons consuming certain types of water may not be receiving the additional minerals that would be present in more highly mineralized waters. Consequently, the exposures and risks should be considered at the individual or family level as well as at the community level. International and national authorities responsible for drinking water quality should consider guidelines for desalination water treatment, specifying the minimum content of the relevant elements such as calcium and magnesium and TDS. If additional research is required to establish guidelines, these authorities should promote targeted research in this field to elaborate the health benefits.

If guidelines are established for substances that should be in demineralised water, authorities should ensure that the guidelines also apply to uses of certain home treatment devices and bottled waters.

Adrian Feru (2004)\textsuperscript{16} in his article entitled “Bottled natural mineral waters in Romania”, stated that “different from drinking water supplied by the municipal network or from other bottled waters, all of which undergo some kind of prior treatment in order to become potable, the natural mineral water is an ecologically pure product, that by virtue of its composition may induce beneficial health effects. According to the EC Directive 80/777, the main criteria used for defining the natural mineral water refer to its original purity and its adequate protection against any pollution hazard. In Romania, mineral water consumption is an old tradition. The geological setting and the existence of unpolluted areas favoured the development of mineral water sources of an outstanding quality, many of which include also carbon dioxide in natural state. The present work presents the main sources of bottled mineral water in Romania, classified as a function of total mineral content, ionic composition and carbon dioxide content. There are also forwarded forecasts concerning the medium-term evolution of the structure of the bottled mineral water market in Romania. In Romania, similar to Germany, the consumer is strongly attached to the habit of drinking carbonated mineral water.

The main common trend on the most European markets is the consumption of the increasingly more water of low mineralisation and reduced CO\textsubscript{2} content. A significant development was recorded in the recent years in the case of oligomineral, still, or CO2 impregnated water. Although the country possesses significant resources of still natural mineral waters, it is hard to believe that in the next 5–10 years the still water consumption will exceed 10–15\% of the bottled mineral water production. Yet taking into account the world-wide trends, an increase of the weight of the low mineralisation, CO2 impregnated water may be expected, up to 30–35\% of the national production.

\textsuperscript{16} Adrian Feru, “Bottled natural mineral waters in Romania”, Environmental Geology Springer-Verlag, 2004, p.670–674
U.Gopala Krishnan (2004)\textsuperscript{17} in his dissertation entitled ”A Study on Consumers Preferences towards various Brands of Mineral Water in Madurai City”, analyzed the buying pattern of mineral water in Madurai city. The study revealed that 40 per cent of the respondents were in the age group of 21-30 years, 38 per cent belonged to graduation level and 26 per cent of the respondents were at post-graduation level. The study further unfolded that 36 per cent of the respondents were government servants, 24 per cent were students and 16 per cent were working in private concerns. Majority of the respondents purchased Bisleri and they had to change the brand only due its non-availability.

Petrie & Wessely (2004)\textsuperscript{18} in their article “Getting well from well” suggest that consumers of bottled water are ‘worried’ about their health and that bottled water ‘exploits’ these concerns. This is a distortion of reality. It is absolutely correct to say that an increasing number of consumers are concerned about their personal health and that of their families, for good reason. Both the medical profession and the government have expressed their concerns about the increasing levels of heart disease, kidney disease and ailments associated with poor diet including excessive consumption of alcohol, sugar and fats. The increase in bottled water consumption in UK is not driven by mass media advertising, nor is it based on misleading bottled water health claims, as the authors suggest, but on the deep-seated and accurate perceptions of consumers from all social classes and walks of life, that including more bottled water in their diet will be beneficial. The World Health Organisation and the UK Government endorse this view and recommend that a balanced diet should include ‘eight glasses of water and five pieces of fruit or vegetable a day’. The essential message, surprisingly ignored in the article, is that some 40\% of the UK population are believed to be dehydrated, and as a result are probably operating below their optimum level of health, with higher levels of constipation, lethargy, etc. operating. The article also implies that the involvement of major soft drinks companies in launching and promoting bottled water is a bad thing, but their intervention has helped drive down consumer prices and their marketing efforts may well persuade consumers to switch to bottled water. Water is, after all, the most effective way of achieving and maintaining hydration whether UK consumers choose water

\textsuperscript{17} U.Gopalakrishnan, “A Study on Consumers Preferences towards various Brands of Mineral Water in Madurai City”, M.Phil Dissertation Submitted to Department of Commerce, Saraswathy Narayanan College, Madurai, 2004

\textsuperscript{18} Petrie & Wessely, “Getting well from water” BMJ Volume, 329 18-25 December 2004, pp- 1417-18
from the tap or the bottle is a matter of personal choice, as both are safe to consume. For those consumers who want an entirely natural drink, Natural Mineral Water is the perfect choice. The growth of bottled water sales shows that consumers are actually responding sensibly to reduce the dangers to health that come from adopting an unbalanced approach to the foods and drinks on offer in the modern western lifestyle. If the medical profession value public health, they would do better to recognize the positive role of water, whether from the tap or bottle in improving the health of the nation, and particularly its children.

Gabriel J. Bowen, David A. Winter (2005)\textsuperscript{19} in their article indicated that bottled and packaged waters are an increasingly significant component of the human diet. These products are regulated at the regional, national, and international levels and determining the authenticity of marketing and labelling claims represent a challenge to regulatory agencies. Here, they present a dataset of stable isotope ratios for bottled waters sampled worldwide, and consider potential applications of such data for regulatory, forensic and geochemical standardization applications. The hydrogen and oxygen isotope ratios of 234 samples of bottled water range from 147\% to 15\% and from 19.1\% to 3.0\%, respectively. These values fall within and span most of the normal range for meteoric waters, indicating that these commercially available products represent a source of waters for use as laboratory working standards in applications requiring standardization over a large range of isotope ratios.

The measured values of bottled water samples cluster along the global meteoric water line, suggesting that bottled water isotope ratios preserve information about the water sources from which they were derived. Using the dataset, they demonstrate how bottled water isotope ratios provide evidence for substantial evaporative enrichment of water sources prior to bottling and for the marketing of waters derived from mountain and lowland sources under the same name. Comparison of bottled water isotope ratios with natural environmental water isotope ratios demonstrates that on average the isotopic composition of bottled water tends to be similar to the composition of naturally available local water sources, suggesting that in many cases bottled water need not be considered

as an isotopically distinct component of the human diet. Their findings suggest that stable isotope ratios of bottled water have the power to distinguish ultimate (e.g., recharge) and proximal (e.g., reservoir) sources of bottled water and constitute a potential tool for use in the regulatory monitoring of water products.

S.Deepah, B. Prasanna T.Srilakshmi (2005)\(^{20}\) conducted a study entitled, “Consumer preference toward mineral water” to weigh the history of the brands and the extent to which the consumers are aware about the brands. The research study also throws light on the effect of advertisement on the sale of brands and consumers preference for brand and its image both by itself and in the competitive context. The study also finds out the extent to which consumers prefer Bisleri, when compared to Kinley and Aquafina. The market is around Rs.700 Crore and growing every year. In 2001 alone, 150 players jumped in the fray for a slice of the pie. A part of the fast moving consumer goods sector, bottled water is the only segments to have shown phenomenal growth of about 50 per cent in 2001 alone.

Diane P. Dupont (2005)\(^{21}\) in his article claims that in addition to the use of home filtration devices, Canadian consumers purchase bottled water as a substitute for tap water. Monthly amounts spent on bottled water range between $1 and $60 with a mean household amount of about $15. This suggests average annual spending per household of about $180. While bottled water purchases may be due to convenience, health concerns may also play a role. In the sample, 71% drink bottled water because of convenience, however, the rest claim to prefer the taste (15%) or have health concerns with their tap water (14%). Home filtration devices and boiling water, however, are used because of worries about the quality of tap water. Eighty-three percent of respondents claim to have heard about as a health concern for tap water and 23% believe it to be of specific concern to their community. In particular, the paper argues that water utility performance can be enhanced by applying one of the most fundamental “economic instruments”, namely the use of information about consumer preferences. Many consumers have “voted with their


feet” by choosing to install in-home water filtration devices or to purchase bottled water. This paper reviews results from Canadian surveys on perceptions of the quality of municipally supplied tap water.

Nils Rosemann (2005)\(^{22}\) in his report said that insufficient water quality mostly affects the poor, who have little power to change policies and priorities and who cannot afford alternatives, such as bottled water, filtering and boiling. The Government of Pakistan officially admitted that “richer households are substantially more likely to have water piped to a tap in the household”. Furthermore, the Government of Pakistan acknowledged that the engagement of corporations, which extract groundwater and sell it as bottled water, might be one of the factors working against water quality improvement because it has reduced the political pressure for improvement by this part of society whose voices are valued and heard. In these circumstances, bottled water remains the only additional source of safe water. Nestlé’s ‘Pure Life’ has developed to meet these new demands. “It originated in the Taking only the lowest 60 percent of income into consideration, the monthly average household income in urban areas was PKR 6,127 and in rural areas PKR 4,936. This average of PKR 5,186 monthly income for one household is not spent for water, especially not for bottled water. Only a small proportion of households pay for drinking water at all. Among the population as a whole, only 17 percent of households pay for water and this proportion reaches only seven percent in rural areas.

In addition to this indirect effect on people’s health, it was explained that Nestlé is under ongoing allegations that its bottled water, especially ‘Pure Life’, is not in compliance with national quality standards. Lack of data and ongoing disputes hinder an exact judgment of these allegations. Nevertheless, one can conclude that if Nestlé’s ‘Pure Life’ is not safe and sold anyway, then this is a direct violation of people’s right to water and to health.

---


26
Paul L.W. Krueger (2005) in his dissertation found that perception of risk depends on how, and by whom, it is communicated. Public practices indicate that drinking water policy and perceptions concerning risk are disconnected. Harold Innis’ “monopolies of knowledge” and William Leiss’ writings on the domination of nature and risk communication illustrate why this disconnection exists and Marshall McLuhan’s “laws of media” are a method for identifying potential reversals of expected outcomes. This thesis addresses risk communication, analyses water policy and legislation, presents the results of a user survey, and makes recommendations for policy formation. The emerging trends revealed that there are differences in the perception of tap water and uses of bottled water or treated water between gender and among different age groups. The community one lives in may have a bearing on these same perceptions and habits, and the only trend that was gleaned from analysing where someone originated from is that those from the Lower Mainland are most likely to use home water treatment devices.

None of the cross tabulations showed any dramatic differences when compared to the overall sample. The ever-increasing sales of bottled water and water filtration equipment give testament to the fact that more are turning to private purveyors of water. Over all, that 60.45% stated they trust tap water, but sixty-one percent buy bottled water regularly more than once a month and 70.5% have a home filtration system or buy the large cooler-type bottles of drinking water (twenty-one percent do both). Of the group that trust tap water, fifty-four percent buy bottled water but twenty-eight percent, who do not trust tap water, do not buy bottled water. Sixty-three percent of those that stated they trust tap water use home water treatment or buy the large cooler water bottles. Conversely, eighteen percent of those who stated they do not trust tap water, do not have home filtration or other water treatment, nor do they buy the large cooler bottles, and seven percent of them must drink tap water despite their lack of trust, or drink no water at all, for they do not filter nor buy large or small bottled water.

23 Paul L.W. Krueger, “Water talk: an analysis of monopolies of knowledge, risk communication and potable water policy in British Columbia”, Master of Arts thesis submitted to Simon Fraser University, USA, 2005
Deborah L Wells (2005)\textsuperscript{24} made a study entitled “The Identified Perception of Bottled Water” This study only employed tap water from one city, Belfast. The taste, and indeed smell, of tap waters can vary markedly, however, between locations, depending upon the amount of chlorine added during the purification process. For comparative purposes, it would be interesting to repeat the present study using tap waters and participants from other areas to determine whether peoples’ opinions on which waters are the most pleasant, pure, natural, or refreshing in flavour vary according to the geographic location under investigation. The findings from this study have implications for the marketing of bottled water. Many foods and drinks are marketed on their flavour. This investigation, however, indicates that bottled water cannot be identified on the basis of its flavour and suggests that the current high consumer demand for this beverage must be based on factors other than taste or olfactory perception, e.g. branding in the marketplace, health concerns, and convenience.

Luz M. Gonzalez (2005)\textsuperscript{25} in his study points out that the primary purpose of his experimental study is to explore the impact of background colour in print advertisements on brand image/personality and brand preferences (e.g., brand attitudes). For example, it is expected that viewers’ perceptions of a brand’s image/personality will reflect the image associated with the ad’s background colour (e.g., a brand will be judged to be more vibrant and exciting when it is advertised with a red background versus a more calming blue background). He used five-dimension theoretical framework, composed of personality traits (i.e., Sincerity, Excitement, Competence, Sophistication, and Ruggedness) determined to be relevant to both human and brand personality and generalizable across product categories. In the interest of completeness, the impact of colour on brand personality beliefs and the more traditional attribute-based types of beliefs is tested here.

Findings indicate that background colour in advertisements impact the advertised brand’s “personality” and brand attribute perceptions: for example, the brand advertised

\textsuperscript{24} Deborah L Wells, “The identification and perception of bottled water”, ISSN 1468-4233 (electronic) Available at www.perceptionweb.com, Perception, 2005, volume 34, pages 1291 -1292

\textsuperscript{25} Luz M. Gonzalez, “The Impact of Ad Background Color on Brand Personality and Brand Preferences”, Business Administration Honors Program at California State University, May 2005

Please purchase PDF Split-Merge on www.verypdf.com to remove this watermark.
with the red background was perceived as being more sophisticated and more exciting than the brand advertised with the blue background. In addition, altering an ad’s background colour rendered a different set of brand personality and brand attribute beliefs salient. Colours can also influence customers’ emotions, positively or negatively. Previous research has shown a consistent association of colours with certain feelings and experiences. For example, the colour “Blue” is soothing and associated with wealth, trust, and security, whereas “Red” connotes excitement and stimulation. In this study, he examined the relationship among colour associations and brand personality, to determine if certain colours tend to create certain reactions about a product. For example, it is expected that viewers’ perceptions of a brand’s image/personality will reflect the image associated with the ad’s background colour (e.g., a brand will be judged to be more vibrant and exciting when it is advertised with a red background versus a more calming blue background). The brand personality measures may be limited: not sufficiently applicable to a product such as bottled water. The R square for the brand personality (BP) regression model was only .376, indicating that only 37.6% of the variance in attitude was explained by the five BP constructs. Similarly, for the brand attribute model, only 52.0% of variance was explained by the set of measured attributes. Measures of brand beliefs and of the importance of these beliefs in choosing bottled water captured health-related, purity, relaxing, refreshing, image, energizing, price, and taste dimensions: health-related (safe, bacteria-free, nutritious, and healthy; α=.89), purity (pure, preservative-free, and clean; α= .87), relaxing (relaxing and calming; Spearman Brown reliability coefficient=. 83), refreshing (cooling, refreshing, cold, clear, thirst-quenching, and fresh; α= .94), image (good image, high quality, expensive, and for special occasions; α=.85).

**Miguel F. Doria (2006)** in his article entitled “Bottled water versus tap water: understanding consumers’ preferences”, says that consumption of bottled water has been increasing consistently over the last decade, even in countries where tap water quality is considered excellent. This paper discusses some of the reasons why people decide for an option that is often more expensive and less comfortable than tap water. Consumer surveys usually stress two main factors: dissatisfaction with tap water organoleptics.

---

(especially taste) and health/risk concerns. However, many other factors are involved, including demographic variables and the perceived quality of the water source. Trust in tap water companies also seems to influence public behaviour. A clearer picture of bottled water consumption can be achieved when different aspects are considered. One of the conclusions of this paper is that more research is needed to corroborate and substantiate the findings of previous research. Most studies on the social aspects have consisted of descriptive surveys.

A larger diversity of methodological approaches, including blind tests and the development of regression models, can lead to a much better understanding of the factors involved and their relative contribution to consumers’ preferences. Cross-national studies, where similar research instruments are applied to different countries, are also needed and can contribute to a better interpretation of national surveys. An improved knowledge of the factors that contribute to the use of drinking water alternatives can contribute to a better understanding of the consumer’s concerns and behaviours. Overall, the reasons for bottled water consumption seem to be varied. Organoleptics and health/risk concerns are the most frequently mentioned causes, but many other factors are involved. The main conclusion is that people generally value “good quality water” and some are prepared to use their wallets to consume what they perceived to be a “purer” or “healthier” product.

Bhushan’s (2006)\textsuperscript{27} in his study “Structure and economics of Indian bottled water industry” reports that the per capita bottled water consumption in India is still quite less than five litres a year as compared to the global consumption of 24 litres. However, the total annual bottled water consumption has risen rapidly in recent times and it has tripled in 1999 and 2004 from about 1.5 billion litre to five billion litres. These are boom times for the Indian bottled industry more so because the economies are sound, the bottom line is sound and the Indian government hardly cares or to what happens to the nation’s water resources. In 2002, the industry had an estimated turnover of Rs.10 crores to Rs.1000 crores. Today it is one of India’s fastest growing industrial sectors, between

\textsuperscript{27} Bhusahan’s, “Structure and Economics of the Indian Bottled Water Industry”, \textit{Frontline}, Volume 23, Issue 7, April 2006
1999 and 2004 the Indian water market grew at a compound annual growth rate (CAGR) of 25 per cent, the highest in the world. The Indian bottled water industry is big by even international standards. More than 200 brands, nearly 80 per cent are local. Most of the small-scale producers sell non-branded items and serve small markets. In fact, making bottled water is today a cottage industry in the country. The Indian bottled water industry flourished with the economic liberalization process in 1991. The market was stagnant until 1991, when the demand for bottled water was less than two million cases a year. However, since 1992, it has not looked back, and the demand in 2004-05 was a staggering 82 million cases.

Sasirega Ramani (2006)\textsuperscript{28} in her work, “A Study on Institutional Consumer Perception of Packaged Drinking Water” found that 37.14 per cent of the respondents were using packaged drinking water for their health purpose. Of these, 16.43 per cent of the respondents were using packaged drinking water as it is hygienic, 6.43 per cent of the respondents were using packaged drinking water for the purpose of “need not carry water purpose, 4.29 per cent of the respondents were using it as it avoids wastage of water, 20.71 per cent using it due to employee demand, 5.71 per cent were using it due to the presence of salt in water for health reasons. The sample questioning also unfolded that all the respondents were choosing good brand of packaged drinking water which was delivered. Majority of the respondents were considering quality, availability and price as important factors while purchasing jars of packaged drinking water, 92.14 per cent of the respondents did not want to shift to other brands after having chosen renowned brands. Most of the respondents expect price discounts as sales promotion scheme. Quite a number of respondents suggested improving the quality of the advertisement.

Richard Wilk (2006)\textsuperscript{29} in his study entitled “Bottled Water: The pure commodity in the age of branding”, says bottled water has become a pervasive global business, and bottled water consumption continues to increase rapidly, particularly in countries where


clean potable tap water is available at very low or no cost. This article discusses the ways the rich cultural meanings of water are used in marketing and branding, and the forms of consumer resistance that oppose bottled water as a commodity. The contrast between tap water and bottled water can be seen as a reflection of a contest for authority and public trust between governments and corporations, in a context of heightened anxieties about risk and health. The article concludes that bottled water is a case where these curiosities are clues that water still has meanings and powers far beyond simple thirst quenching, powers linked to the transformation of ‘wild’ water in puddles, streams, ponds and rainstorms, into a domestic partial-commodity. Long ago, magicians and priests could transform and manipulate the powers of natural substances; today charismatic celebrities, governments and corporations contend with one another for the same powers. But standing in the middle of the battle is still a thirsty person. They can decipher the historical and cultural logic, and the various collusions and conflicts between buyers and sellers that make bottled water a plausible, and perhaps even inevitable, product of our times. At some level, they can use all the tools of social science to make sense and reason out of bottled water.

But in doing so people do not want to lose sight of the ultimate absurdity: the waste and inequality of the bottled-water trade. We have a world with acknowledged ecological problems, rising energy prices, and global climate change, where a significant amount of energy and materials are being expended to transport water to places that already have plenty of it, freely available. Then, there are the billions of plastic bottles manufactured and then discarded, littering the land and ocean, or being buried in landfills or incinerated at public expense. Here they have a world economy in which more than a billion people do not have access to any kind of regular clean water supply, while another billion are spending huge amounts of money on water that provides only a tiny marginal benefit in their lives. The sound cultural logic leads to environmentally destructive behaviour.

John Connell (2006)\textsuperscript{30} in his article entitled ‘The Taste of Paradise’: Selling Fiji and FIJI Water”, says that the global market for bottled water continues to grow but an

increasing number of competitors have begun production. Almost all are in larger states nearer to key markets and most also emphasize close links with nature, in name and bottle label, design and wording. Although transport costs are disadvantageous to FIJI Water, the market is primarily of more affluent consumers to whom price differentials are less important than perceived purity and status. Yet, despite competing for an elite market, FIJI Water does not, and cannot, sell for significantly more than its competitors. In the last decade, bottled water has become a major food product and a new segment of the ‘food’ market. This has followed both some degree of concern over the quality of tap water, and the perceived purity of ‘spring’ water and the status attached to drinking a bottled product. What is essentially the oldest ‘food’ of all has been popularised and, through reinvention as a health product, sold to health-conscious individuals, in the same way that such products as ‘extra virgin’ olive oil are marketed. Consumption is thus not merely an individual process but typifies the emergence of a new, urbane consumer niche, where people use consumer goods to signify who they are and, in so doing, are constituted as a new ‘cultural class’ (May, 1996). Through this process bottled water has become both fad and fashion.

The global market for bottled water has rapidly grown, primarily in developed countries, but also in relatively poor countries where concerns over water quality have some validity. From the late 1990s, the world bottled water market grew at an annual rate of over 10%, and has achieved double-digit growth in all but two years since the start of the 1990s. Major transnational food companies such as Nestle, Pepsi and Coca-Cola have all moved into water, and more than 120 bottled waters were introduced into the USA in 2004. More than 2900 brands of bottled water are produced in over 115 countries and the majority of these stress some kind of link between product and place (as much as links with quality).

Mark Miller (2006)31 “This paper addresses each aspect of bottled water as a product, its history, its purpose, its material, its advantages, its disadvantages and its costs; correlates it with bottler’s marketing activities, and ties those to sales and government regulations. These comparisons will address and progressively eliminate the

different qualities of bottled water as a whole product in order to arrived at the most likely reasons for its phenomenal success. The activities of the bottlers have also been unsavoury. While it is true they are simply trying to make a living, they are doing so by sabotaging, to some degree, publicly financed utilities.

The companies tap into a municipal water system, and begin bottling the water. This is cheaper than tapping a spring or aquifer, and is also pre-cleaned for easy bottling. This in turn reduces quality control overhead and the number of tests done, making the water ultimately less safe after travelling through so many machines. Furthermore, the discarded bottles are amassed in landfills, where they leach out and contaminate the groundwater. Despite this, all the company needs to do next is to market the product as the cleanest, purest, and healthiest water, and watch the stock price soar. The bottled water, however, is not as clean or as reliable as tap water and is not subject to the strict EPA standards. Because bottled water squeaks under the regulation radar with its Model Code and its manufacturing guidelines, there is a certain amount of laxity in regards to quality. If consumers were more aware of this elevated danger, it is logical that the actual quality of the bottled water is not the cause for the growth of the bottled water industry.

**Rakesh Kumar Mahajan, T.P.S. Walia, B.S. Lark & Sumanjit (2006)**

Seventeen different brands of bottled drinking water, collected from different retail shops in Amritsar, were analyzed for different physical and chemical parameters to ascertain their compliability with the prescribed/recommended limits of the World Health Organization (WHO) and the United States Environmental Protection Agency (USEPA). It was found that the majority of the brands tested were over-treated. Minerals like magnesium, potassium, calcium and fluoride were present in some cases in such a low concentration that water seemed to be as good as distilled water. Samples showing fluoride lesser than 0.5 mg/l warranted additional sources of fluoride for the people consuming only bottled water for drinking purposes. Zero values for chlorine demand as shown by all the bottled water samples showed that water samples were safe from micro-organisms. In case of

---

heavy metals, only lead had been found to be greater than the limit of 0.015 mg/l as prescribed by WHO and USEPA, in seven out of 17 samples. Lead even at such a low concentration can pose a great health hazard.

In India, the core proposition of bottled drinking water lies in hygiene because the quality of tap water is bad and is rapidly deteriorating due to the aging of the water and sewerage pipes. This is in stark contrast with the West where ‘mineral water’ indicates the attendant minerals present in the water. Mineral water in Western countries is obtained from natural springs and is, generally, named after those springs. Most of the bottled water passed off as mineral water in India, however, is filtered, boiled or purified by other means such as chlorination, deionization and reverse osmosis. A better description of bottled drinking water sold in India, therefore, would be “‘purified bottled water’”. The non-existence of strict norms on bottled drinking water in India, has led to the mushrooming of many small-scale units producing bottled water under different brand names.

**Cashman (2006)**\(^{33}\) argue that regulation has been the most important driver in encouraging the water industry to move towards sustainability, but increasingly the appropriateness and effectiveness of regulation are being questioned. It is argued that, in its present form, sustainability as presented and supported through regulation equates to a form of weak sustainability that privileges the economic and subordinates the environment and societal spheres of sustainability. To overcome this, it requires more long-term perspectives, participatory mechanisms and moves beyond efficiency to intensity of resource use. The embedding of weak sustainability in the way in which water companies have been regulated has privileged end of pipe solutions over more holistic approaches. Ultimately this will not lead to a sustainable water sector, and changes need to be made to encourage and facilitate the incorporation of sustainability into the way in which water companies and the industry regulators act.

---

\(^{33}\) A. Cashman, “A watery form of sustainability”, *Water and Environment Journal*, ISSN 1747-6585, Volume 20, Issue 1, February 2006, pp. 2-6
Barrie Stevens, Pierre-Alain Schieb and Michel Andrieu (2006) found that most of the developed world and the wealthiest customers in the developing countries do not pay the true economic costs of water services and the poorest have to purchase water from local carriers or bottles at up to 500 times the cost for their wealthy neighbours in the same country. Despite the availability of good-quality, continuous water supply from the tap in developed countries, there is an increasing demand for bottled water. This may be due to perceptions that it is of better quality, or for taste, fashion or convenience. Globally, the expenditure on bottled water has now reached some USD 100 billion per year and consumption is growing at a rate of 10% per annum. The largest consumers are the United States, Mexico and China, with consumption in China growing the fastest in the period 1997-2002. Regionally, there has been considerable growth between 1997 and 2002 on all continents except in Africa. The amounts being spent on bottled water worldwide could pay for piped supplies to most of the world currently lacking these facilities, and the material and transport resource use and pollution from the packaging (mostly PET plastic) have major impacts. In some developing countries, manufacturers continue to over-abstract from aquifers to produce high-cost bottled water, compromising local supplies.

Although the demand for bottled water could potentially reduce the need for global infrastructure for piped supplies this may be offset by the ensuing increases in energy demand, waste production and transport infrastructure needs. Increasing demand for bottled water may also influence decisions about the need to maintain the serviceability of existing water infrastructure assets. Ironically, the quality of bottled water is often dubious. Wholesale rural water service investments have never been attractive to the private sector, and private participation is typically via specific activities such as supply and distribution of bottled water or the offering of particular services within the water supply and disposal chain. In rural areas local SMEs have a more important role in these services.

Vijayalakshmi (2006) in her study identified that on the five factors considered to be determining the brand preference, namely quality, price, offer, change and customer service, only in the case of three factors that is quality, customer service and price a majority of 95 per cent, 64 per cent and 59 per cent of the respondents respectively have assigned within the first three ranks therefore, the two other factors such as offer and wanted a change are not considered as major determinants in purchasing decisions. People prefer a particular brand of mineral water for various purposes. The analysis of choice of mineral water by respondents have revealed that most of the consumers have preferred Kinley at first followed by Safa in the second place and Aquafina in the third place.

Gabriel R. Kassenga (2007) conducted a study on “The health-related microbiological quality of bottled drinking water sold in Dar es Salaam, Tanzania”. He found that the consumption of bottled and plastic-bagged drinking water in Tanzania has increased largely because of the deteriorating quality of tap water. It is uncertain whether these water products are safe for drinking. In this study, the microbiological quality of bottled and plastic-bagged drinking water sold in Dar es Salaam, Tanzania, was investigated. One hundred and thirty samples representing 13 brands of bottled water collected from shops, supermarkets and street vendors were analysed for total coliform and faecal coliform organisms as well as heterotrophic bacteria.

These were compared with 61 samples of tap water. Heterotrophic bacteria were detected in 92% of the bottled water samples analysed. Total and faecal coliform bacteria were present in 4.6% and 3.6%, respectively, of samples analysed with a tendency for higher contamination rates in plastic-bagged drinking water. Microbiological quality of tap water was found to be worse compared with bottled water, with 49.2% and 26.2% of sampling points showing the presence of total coliform and faecal coliform organisms, respectively. The results suggest caution and vigilance to avert outbreaks of waterborne diseases from these types of drinking water. Although the sources of contamination were not determined, it was suspected that storage of bottled water products in unhygienic and high temperature conditions, defective packaging and lack of protective measures against

bacterial re-growth were probably the main contributing factors affecting the bacteriological quality of bottled water. There is a possibility that water was contaminated before bottling as other previous studies also observed. The degree and rate of contamination suggest a need to be cautious and vigilant to avert the possibility of an outbreak of waterborne diseases from these types of drinking water. Regulations geared towards the prevention of exogenous sources of contamination of bottled water products should also be enforced.

State of the environment report (2007)\textsuperscript{37} on “Environment and health”, disclose that this is one of India’s fastest growing industrial sectors. The all-India market for packaged water is between Rs. eight billion and Rs. 10 billion and is growing at the rate of nearly 40 per cent per annum. The ubiquitous bottled water is a common sight even in the remote villages of India. This signals the low confidence of the public in the safety of their water supply. People in many states depend on packaged water to mitigate the acute shortage of drinking water. Water vendors are also common in India, especially in the unserved areas of water-short cities. Such privately vended water - which seldom has any quality controls, sells for from 5 to 50 times the price of piped city-supplied water. For example, water-starved people of Chennai have paid nearly Rs. 500 million to private water companies for 3.7 billion litres of potable water each month to augment the inadequate supply delivered by the state-run Metro Water.

There are several water packaging units (approximately 200 legal and 400 illegal) in the city which sink powerful pumps in small plots of land, in effect privatizing entire aquifers of common groundwater resources. Several million litres of precious water get wasted in the process. Even the conservative figures declared by the industry indicate that packaged water units waste anywhere between 15 and 35 percent of the water they draw from the ground. Boiling water, before drinking, is a time-tested method of water purification, but this tradition is being gradually replaced by the increasing use of bottled water. There is no scientific study yet to establish the effectiveness of this traditional practice. If proven effective, this has the potential to change the impact of many waterborne diseases on human beings and can be shown as another Kerala model of achieving good health outcomes with traditional knowledge.

Anthony Jerry (2007)\textsuperscript{38} had carried out a study on water supply crisis in Impal and India and compares the potential of several supply mechanisms using the criteria related to quantity and reliability of supply, water quality, equity in access, environmental impacts and cost recovery and sustainability. The evaluation is grounded on data from household surveys, visits to water production treatment and distribution facilities and interviews with local officials’ results suggest that planning and investment options for drinking water in developing countries should not be limited to centralized solutions, instead decentralized, community-based approaches should be supported and promoted.

Teshamulwa Okioga (2007)\textsuperscript{39} in his study states that 4P’s applied by Sachet-water Vendors Product that is Product, Price, Place, and Promotion. They consider the water quality, for both hand-tied and factory-produced sachet water, and the brand name and company reputation of factory-produced sachet water. From interviews directed to customers of sachet water, 80% felt that the water quality of factory-produced sachet water was good and only 33% felt the same for hand-tied sachet water. The fact that factory-produced sachet water was generally considered to be “pure water” may have been a reason why 90% of the interviewees bought it despite it being more expensive when compared to hand-tied sachet water (90% also includes those who bought both hand-tied and factory-produced sachet water). Reasons for choosing specific sachet-water brands included the quality of the physical product itself, convenient availability, the brand name and company reputation. 40% of the respondents preferred “Voltic” sachet water. Voltic, which has been in the Ghana market for the longest time, was established in 1995 and holds 65% market share in Ghana.

Shrivastava Brajesh K. and Alam Masood (2007)\textsuperscript{40} who did a research on the qualitative assessment of the water consumption for manufacturing bottled water at Rail Neer plant came to a conclusion about the total production and cumulative water

\begin{footnotesize}
\textsuperscript{38} Anthony Jerry, \textit{Journal of the American planning association}, Spring 2007, Vol.73, Issue 2, pp.223-237
\textsuperscript{39} Teshamulwa Okioga , “ Water Quality And Business Aspects Of Sachet-Vended Water In Tamale, Ghana”, Master of Engineering in Civil and Environmental Engineering thesis Submitted to the Department of Civil and Environmental Engineering, University of Nairobi on May 18, 2007
\end{footnotesize}
consumption of various water treatment units used in water treatment at Rail Neer plant, Nangoli, Delhi to meet Bureau of Indian Standards specification for packaged drinking (IS:14543:2004) and various amendments incorporated till February 2006. The treatment system comprises chlorination, activated carbon filtration, and pesticide removing system, softener, ultra filtration, UV disinfection and ozonation. The study itself was carried-out following Good Manufacturing Practices (GMP) and Good Laboratory Practices (GLP). It was found that for manufacturing one litre of Rail Neer packaged drinking water 1.64 litre water was consumed.

D.Murali and C.Ramesh (2007) in their article, “Packaged drinking water Industry that they see in the Tip of the Ice berg”, disclose that from being confined to the upper most echelons of society, packaged water has now become a commonplace commodity and almost a dire necessity in metros. After witnessing a historic growth in recent years, it has become a Rs.10,000-crore business in just three years. The industry’s phenomenal growth in recent years can be attributed to rising incidence of waterborne diseases; improper municipal supplies evolved health consciousness of people as well as globalization, which has brought in tremendous tourist inflow. Now that the industry has matured, only big companies with branded products will be in the fray to capture a large market share. Though the industries’ growth rate is 40-50 per cent a year, India is still behind countries such as Indonesia, Malaysia and Singapore, where the industry is already worth Rs. 15,000-20,000 crores, though these countries have much smaller population but similar climatic conditions.

Chris Fife-Schaw, Tanika Kelay, Irene Vloerbergh, Jonathan Chenoweth, Greg Morrison, and Christina Lundehn (2007) state that bottled water purchasing can provide information about consumers’ willingness to pay for water services as the purchase of bottled water may indirectly reveal a willingness to pay for higher quality drinking water (a ‘revealed preference’ in economic terms). They argue that bottled water and filtered water are perfect substitutes for tap water since they fulfil the need for

---

drinking water, with bottled water being purchased either as a risk-averting behaviour by consumers to avoid a perceived (or ‘real’) risk, or for reasons of improved taste and odour, or appearance and/or convenience. It is assumed that bottled water prices are high because consumers are willing to pay these prices though note that drinking water from municipal supplies is essentially free given the price charged for municipal supplies and the relatively tiny quantities each individual can consume. According to the bottled water industry, between 1999 and 2004 growth in global sales leapt from 98.4 to 151.4 billion litres (26 to 40 billion gallons) per year. Market analysis has revealed that in 2005 alone, the global bottled water market advanced by 8.3%, with bottled water volumes reaching 173 billion litres, and is believed that it is likely to continue to increase in the future.

R. Jeya (2007) in her dissertation, “A study on consumers’ attitude towards branded mineral water in Kovilpatti town”, concludes that water is a main part of human beings daily life. The consumers have their choices of mineral water. Brand name of the mineral water plays an important role on purchase decision of the consumers. Different attributes of mineral water influence the purchase decision of the consumers. Buyer behaviour is the psychological, social and physical behaviour of potential consumers as they are able to evaluate, purchase, consume and tell other people about the products and services. It is the act of considering different facts of benefits expected from the product before affecting the purchase of the product.

Kimberley De Wolff (2007) in his study explored the rise in the consumption of bottled water and the dominant narratives of normalization that seek to explain it. Commonly understood as the cumulative result of the power of marketing and misinformation, or the gullibility of ‘irrational’ consumers, the pervasive phenomenon of drinking bottled water is explained as another instance of the commodification of everything. However, these narratives contain a rather surprising omission; while it may seem obvious to state that bottled water is about bottles and water. The role of the bottles themselves in enabling the consumption of water ‘on the go’ to become such a ‘normal’


44 Kimberley De Wolff, H20 to Go: Marketing and Materiality in the Normalization of Bottled Water, Master of Arts thesis submitted to the Department of Sociology, Queen’s University, Canada, 2007
aspect of daily life is noticeably absent. He argues, by drawing upon work in consumer culture studies, sociologies of the brand, and material culture, that they need to reconsider the role of bottled water as both a brand and material object. Following the trajectories of two major brands of bottled water Perrier and Dasani through a content analysis of marketing and associated materials, it can illustrate some of the diverse ways in which bottled water, marketing and consumption are interrelated in the divergent and convergent trajectories of ongoing processes of normalization. In conclusion, one can consider how such theoretical and empirical observations pose difficult questions and new challenges for those seeking to alter practices of consumption.

M.S. Aini, A. Fakhrul-Razi, O. Mumtazah & J.C. Meow Chen (2007)\(^\text{45}\) in their study show that Malaysia has abundant water resources and adequate rainfall and yet the nation has water shortages and water quality problems. Various measures have been taken by the government to address water issues but, in spite of these, quantity and quality of drinking water is still one of the main concerns of Malaysian consumers today. An exploratory study was undertaken to determine the level of awareness of respondents on water issues, assess their perception on drinking water quality, and identify measures undertaken by households to improve drinking water quality and to determine sustainable water practices. A cross-sectional research design, utilizing a survey was conducted among urban residents of Seremban town. Data showed that each household had a mean of five members, with an average household income of RM3788.00 (US$1000). The respondents were Chinese (70%), Indian (23%) and Malay (7%).

The majority of respondents rated the quality of water supplied to their house as poor (70%), while 16% rated it very poor. The respondents indicated that colour, odour and taste were the main problems with their tap water. Due to the poor tap water quality perceived by respondents, most took additional measures to improve its quality. Most (85%) purchased domestic water filters, 41% used boiled water and 17% bought bottled water. The reasons for purchasing water were: concern for health, perception of poor tap water quality, and increasing water contamination and pollution in the country. Almost a

quarter of respondents that had water filters mentioned the convenience because they did not have to boil water. Sustainable use of water by respondents was moderate, with a mean of 2.9 on a scale of 1 (never) to 4 (all the time). Sustainable water practices are also proposed. Reasons cited by consumers for purchasing bottled water or using home purification systems are: improved taste, greater safety, better quality, healthier, untreated natural mineral water is perceived as natural; affordability, convenience, and rising social status. Consequently, water industries echo these arguments in their publicity material.

B. Chitra (2008)\(^{46}\) studied consumer awareness, brand preference and satisfaction of packed drinking water in Coimbatore city”. Her objective of the study was to find out the consumer awareness towards various packed drinking water. She observed that all the respondents were aware of the availability and marketing of packed drinking water. A total of 52.8\% of the respondents were aware of three main brands called Biseleri, Siruvani and Kinley respectively in the ratio 19\%, 17.5\% and 16.3\%. The other remaining 47.2\% respondents were aware of the other brands namely Zill Drops, Kaveri, Surabhi, Aqua fina, Aquapuraa, Sabols and Ashwa.

Sathya Priya (2008)\(^{47}\) in her study analyzed the various factors which determine the awareness of a product and influence of purchase decision. Satisfaction of product and media of advertisement are discussed and evaluated in detail. The study points out that the forthcoming years will be more challenging for the water purifier manufacturing industry to increase its penetration through an increased awareness by better products suited to the needs of the customers, appropriate distribution take water purifier to masses and better customer servicing. Taking the company to the heights of international excellence will require a combination of new technologies, better and quicker processing of credit appraisal, product diversification, internet control and human resources. The task is heavy but a beginning has to be made. Therefore, the management of the companies should emerge stronger in line with the international standards at the same to time meet the national goal as well.

\(^{46}\) B.Chitra “A study on consumer awareness brand preference and satisfaction of packed drinking water in Coimbatore city”, M.Phil Dissertation submitted to Bharathiar University, Coimbatore, 2008

S. Jeevitha (2008) studied the customer attitude towards water purifier in Perundurai taluk which reveals that the most of the respondents preferred Aqua Guard water purifier and they are highly satisfied with the usage. Marketers have to go beyond the various influences on buyers and develop an understanding of how consumers actually make their buying decision and suggested that the advertisement may not be repeated frequently because the reputation irritates the viewers. Advertisements for the products may make clearer with proper explanation about the product.

Maqbool Ahmad, Ahmad S. Bajahan (2008) in their article “Quality comparison of tap water vs. bottled water in the industrial city of Yanbu (Saudi Arabia)”, compared the quality of bottled water with potable desalinated tap water. Fourteen brands of local and imported bottled water samples were collected from the local market and analyzed for physicochemical parameters in the Royal Commission Environmental Laboratory. Results were compared with 5-year continuous monitoring data of tap water from different locations in Madinat Yanbu Al-Sinaiyah (MYAS) including storage tanks of desalination plant. Results show that there was no significant difference in the quality of tap water and bottled water. Bacteriological test was never found positive in the 5-year data in tap water. Similarly, physicochemical analysis shows the persistent quality of tap water. Based on hardness analysis, bottled and tap water are categorized as soft water. Trihalomethanes (THMs) study also indicates that traces of disinfection by products (DBPs) are present in tap and bottled water and are much less than the World Health Organization and Environmental Protection Agency maximum permissible limits.

It is also important to note that the tap water distribution network in MAYS is a high-pressure recirculation network and there is no chance to grow bacteria in stagnant water in pipe lines or houses. Recently, the Royal Commission has replaced the whole drinking water network, which was made of asbestos-cemented pipes with glass-reinforced plastic (GRP) pipes, to avoid any asbestos contaminations. Based on these results, it is

---


concluded that drinking water distributed in the city is of very good and persistent quality, compared with bottled water. Continuous monitoring also guarantees the safe drinking water to the community. Hence, it is the responsibility of the Royal Commission to encourage the people in the city to drink tap water since it is as good as bottled water, even better than some of the brands and is monitored regularly.

**P.H. Gleick and H. S. Cooley (2009)** in their article, “Environmental Research Letters As bottled water use continues to expand around the world”, say that there is growing interest in the environmental, economical, and social implications of that use, including concerns about waste generation, proper use of groundwater, hydrologic effects on local surface and groundwater, economic costs, and more. A key concern is how much energy is required to produce and use bottled water. This paper estimates the energy footprint required for various phases of bottled water production, transportation, and use. They do not develop a single comprehensive life-cycle energy estimate because of differences among water sources, bottling processes, transportation costs, and other factors, but they quantify key energy inputs necessary for site-specific assessments. They also apply these inputs to three site-specific examples of the energy required from production to the point of use: local bottled water produced and used in Los Angeles, water bottled in the South Pacific and shipped by cargo ship to Los Angeles, and water bottled in France and shipped in various ways to Los Angeles. For water transported short distances, the energy requirements of bottled water are dominated by the energy used to produce the plastic bottles. Long-distance transport, however, can lead to energy costs comparable to, or even larger than, those of producing the bottle. All other energy costs for processing, bottling, sealing, labelling, and refrigeration are far smaller than those for the production of the bottle and transportation. These data can be used to generate specific estimates for different sources, treatments, and delivery options.

---

Nazeer B. Khan, Arham N. Chohan (2009)\textsuperscript{51} in their article “Accuracy of bottled drinking water label content”, revealed that accuracy of the concentration of fluoride (F), calcium (Ca), pH, and total dissolved solids (TDS) levels mentioned on the labels of the various brands of bottled drinking water available in Riyadh, Saudi Arabia. Twenty-one different brands of locally produced non-carbonated (still water) bottled drinking water were collected from the supermarkets of Riyadh. The concentration of F, Ca, TDS, and pH values were noted from the labels of the bottles. The samples were analyzed for concentrations in the laboratory using the atomic absorption spectrophotometer. The mean level of F, Ca, and pH were found as 0.86 ppm, 38.47 ppm, and 7.5, respectively, which were significantly higher than the mean concentration of these elements reported in the labels. Whereas, the mean TDS concentration was found 118.87 ppm, which was significantly lower than the mean reported on the labels. In Countries like Saudi Arabia, the appropriate level of F concentration in drinking water as recommended by World Health Organization (WHO) should be 0.6–0.7 ppm. Since the level of F was found to be significantly higher than the WHO recommended level, the children exposed to this level could develop objectionable fluorosis. The other findings, like pH value, concentrations of Ca, and TDS, were in the range recommended by the WHO and Saudi standard limits and therefore should have no obvious significant health implication.

Yael Parag & J. Timmons Roberts (2009)\textsuperscript{52} in their study stated that the environmental impact of the rising consumption of bottled water is over 100 times higher than drinking tap water. So its rise has grave implications for the environment and society. This article argues that the increasing flight from drinking tap water is at least partly the result of the growing distrust of the state’s ability to protect the health of its citizens. This distrust snowballs through several stages in the process by which policy is designed and carried out. Bottled water firms contribute subtly to this distrust and weakening of public policy responses. The article suggests that some institutional and procedural changes are needed to restore trust, such as proactive public involvement in


the problem analysis procedures, increased transparency at the enforcement stage, better science communication, public display of trust in tap water by officials, and labelling on bottled water about its environmental impacts.

**Lorna A Ward et al., (2009)**⁵³ article entitled “Health beliefs about bottled water: a qualitative study”, in their study stated that there has been a consistent rise in bottled water consumption over the last decade. Little is known about the health beliefs held by the general public about bottled water as this issue is not addressed by the existing quantitative literature. The purpose of this study was to improve the understanding of the public's health beliefs concerning bottled mineral water, and the extent to which these beliefs and other views they hold, influence drinking habits. Health beliefs about bottled water could be classified as general or specific beliefs. Most participants believed that bottled water conferred general health benefits but were unsure as to the nature of these. In terms of specific health beliefs, the idea that the minerals in bottled water conferred a health benefit was the most commonly cited. There were concerns over links between the plastic bottle itself and cancer. Participants believed that bottled water has a detrimental effect on the environment. Convenience, cost and taste were influential factors when making decisions as to whether to buy bottled water; health beliefs were unimportant motivating factors. The majority of participants believed that bottled water has some health benefits. However, these beliefs played a minor role in determining bottled water consumption and are unlikely to be helpful in explaining recent trends in bottled water consumption if generalised to the UK population. The health beliefs elicited were supported by scientific evidence to varying extents. Most participants did not feel that bottled water conferred significant, if any, health benefits over tap water.

**Catherine Trottier (2009)**⁵⁴ states that the bottled water industry portrays itself as a ‘green’ industry by claiming that they are “committed to actively participating in recycling and educating the public about the importance of recycling bottled water

---


⁵⁴ Catherine Trottier, Murky Waters-The Urgent Need for Health and Environmental Regulations of the Bottled Water Industry, Polaris Institute, 2009, Available at http://www.polarisinstitute.org/files
containers and all recyclable materials”. In response to increasing criticism on the environmental impacts of plastic bottles, bottled water corporations have further attempted to green wash their products by introducing ‘new packaging’ with less plastic. Nestlé, for instance, is now promoting a new ‘eco-shape’ plastic bottle that consists of 30% less plastic, in addition to other packaging reductions. However, the truth is fact is that the bottled water and plastics industries are closely connected: “bottled water manufacturers are the end point of a supply chain that contains some of the biggest polluters on the planet”.

The plastic industry includes big oil giants such as Royal Dutch Shell, Exxon Mobile and British Petroleum. Terephthalic acid and monoethylene glycol (MEG) are derived from crude oil, are the two primary raw materials used to produce polyethylene terephthalate (PET) plastic. “80% of the PET produced in the United States ends up in a Coca-Cola, Pepsi or Nestle beverage or container”. Through NAPCOR (National Association for PET Container Resources) an association which joins the bottled water and plastic industry and operates in North America, and similar trade associations, “bottled water companies and the plastic resource companies have spent millions of dollars to weaken and /or defeat bottle bills and recycled-content legislation, often outspending their opponents as much as 30 to 1,”. Moreover, manufacturers of recycled plastic are unable to compete with producers of virgin plastic products due to the relatively low cost of petroleum used in manufacturing them, . The simple fact is that bottled water can never be an environmentally friendly product. When the entire lifecycle of a bottle of water is considered – production, transportation, disposal the full energy and environmental implications of the bottled water industry are proven to be extremely harmful. No amount of recycling can dispute the fact that the most environmentally friendly way to drink water is from the tap.

Martin Wagner & Jörg Oehlmann (2009) in their study on “Endocrine disruptors in bottled mineral water: total estrogenic burden and migration from plastic bottles”, stated that Food consumption is an important route of human exposure to

---

55 Martin Wagner & Jörg Oehlmann, “Endocrine disruptors in bottled mineral water: total estrogenic burden and migration from plastic bottles”, *Environmental science and pollution research international*, Volume 16, Number 3, 278-286, 2009
endocrine-disrupting chemicals. So far, this has been demonstrated by exposure modelling or analytical identification of single substances in foodstuff (e.g., phthalates) and human body fluids (e.g., urine and blood). Since the research in this field is focused on few chemicals (and thus missing mixture effects), the overall contamination of edibles with xenohormones is largely unknown. The aim of this study was to assess the integrated estrogenic burden of bottled mineral water as model foodstuff and to characterize the potential sources of the estrogenic contamination.

In the their study, they analyzed commercially available mineral water in an in vitro system with the human estrogen receptor alpha and detected estrogenic contamination in 60% of all samples with a maximum activity equivalent to 75.2 mg/l of the natural sex hormone 17β-estradiol. Furthermore, breeding of the molluskan model Potamopyrgus antipodarum in water bottles made of glass and plastic [polyethylene terephthalate (PET)] resulted in an increased reproductive output of snails cultured in PET bottles. This provides first evidence that substances leaching from plastic food packaging materials act as functional estrogens in vivo. They concluded that a widespread contamination of mineral water with xenoestrogens that partly originates from compounds leaching from the plastic packaging material. These substances possess potent estrogenic activity in vivo in a molluskan sentinel. Overall, the results indicate that a broader range of foodstuff may be contaminated with endocrine disruptors when packed in plastics.

Laszlo Sipos (2009)\textsuperscript{56} in his study indicated that the concerned mineral water consumers prefer the disposable, one-way bottle than the returnable one much more. 80\% of them do not take attention to buying a returnable bottle. A smaller group of 16\% prefers the returnable bottles and just a “few” consumers (4\%) choose only this type of packaging decidedly. Another important result of my survey is that the ratio of female consumers is two times higher than the one of male consumers if they focus on the group with a returnable bottle preference. This might refer to the more environment conscious attitude of women. There is a detectable change in the frequency of mineral water consumption patterns and sensory evaluation of mineral waters, PhD Dissertation, Business Administration and Management Sciences, 2009, Available at http://phd.lib.uni-corvinus.hu/360/3/sipos_laszlo_ten.pdf

consumption among the interviewed group of full-time university students – they tend to follow a healthy lifestyle.

This is supported by the fact, that 64% of the consumers are conscious about following a healthy diet, and only a low percent of them (15%) are neglecting this factor. The remaining 21% deal with this matter only occasionally. Tap water has a definitely bad appreciation among mineral water consumers. Every second student (53%) stated that they choose mineral water instead of tap water as frequently as it is possible. The inquired consumers usually rotated 4-5 brands in the last few years. This is also typical for the purchasing patterns of 39% of them. Only one-fourth of the groups use more brands, and 20% have only 2 or 3 favourite ones. There is a minority of 16% who insist to having only one brand.

O.A. Olaoye, and A.A. Onilude (2009)\textsuperscript{57} in their article pointed out the need for processors of sachet packaged drinking water in Nigeria to improve their processing operations, especially in terms of hygiene, and to ensure strict compliance with guidelines as set by Nigeria’s quality regulatory body. This study also revealed that the consumers of sachet-packaged drinking water could be at serious risk if necessary measures are not taken to improve quality. In addressing the public health concerns that are being generated by the sachet-packaged drinking water phenomenon in developing countries, especially Nigeria, intensive efforts are required in educating the processors, distributors and handlers of the product. Training should focus on the need for good personal hygiene and strict compliance with good manufacturing practices. Possession of hygiene certificates by staff of organizations seeking a licence for the production of sachet-packaged drinking water could be a useful criterion before approval is given. These measures will greatly enhance quality in operational procedures with subsequent promotion of public health safety among consumers of the product. The Government should give NAFDAC the necessary support to enforce their guidelines. Public enlightenment will also help consumers to be aware of what to look for on the package label before purchasing water for consumption.

A.Raju (2009)\textsuperscript{58} concluded that marketing plays a pivotal role in the development of a country. The development of marketing has always kept pace with economic growth of the country. Now the modern marketing faces high competition in their activities. Earning profit is possible only through consumer satisfaction. Aqua Guard water purifier is a leading company introducing the best water purifier equipments. The company has got good name and fame for its quality and innovative products to satisfy the current demand for their customer. Even though it has great strength, it is no more left by competitors. It has to hardly compete with Eureka Forbes and it is a toughest competition too. To overcome this competition the company should introduce and adopt new technological advertisement in such a way. The effective advertisement should introduce potential customer, to create new customers and also satisfy the existing customer, after sales service of the company is highly satisfied. So the company should maintain the same standard.

Huiju Tsai (2009)\textsuperscript{59} claims that the global bottled water industry has been enjoying great prosperity in the past decade. In 2007, world consumption of bottled water totalled 188 billion litres, with an average annual growth rate of 8.8\% from 1997 to 2007. Total revenues of the global bottled water market was $US 66.6 billion in 2007, representing a compound annual growth rate (CAGR) of 6.2\% for the period 2003-2007. However, while the industry has been expanding at a high speed, “Back to the Tap” movement against bottled water developed in Northern America, Europe and other developed countries in recent years. City governments, high-class restaurants, schools, and religious groups urge to ditch bottled water and encourage people to drink the public water from the faucet. Environmentalists condemn bottled water as wasteful and even immoral. Bottled water has been seen as an ‘Eco-sin’. This article aims to give an insight into this issue. The stands of the protests, consumer views and bottling companies are

\textsuperscript{58} A.Raju , A study on consumer satisfaction towards Aqua Guard water purifier in Erode town with special reference (Eureka Forbes), M.Phil dissertation , department of commerce, Kongu Arts and Science college affiliated to BharathiLar University, Erode, 2009

\textsuperscript{59} Huiju Tsai, ‘Back to the Tap’: a Global Battle against Bottled Water Industry, The IMRE Journal Volume, 3 (1) 2009, Available at http://www.wiwi.tu-freiberg.de/~urm/imre/journal/index.htm
analyzed and commented. Measures to be taken are further discussed. Finally, the potential new markets that might emerge under the anti-bottled water trend are explored.

Diane Dupont (2009)\textsuperscript{60} in her study stated that in 2000 and 2001, Canadians were shocked by water contamination events that took place in two provinces. In 2004, they undertook an internet-based survey across Canada that asked respondents to identify in percentage terms their total drinking water consumption according to one of three sources: tap water, bottled water, and home filtered water (either some type of container or an in-tap filter device). In this paper she investigate the determinants of these choices and whether choosing to either filter or purchase water is linked to perceptions of health concerns with respect to tap water. A series of one-way ANOVA tests suggest that past experiences with unpleasant water tastes or smells and greater expressed concern that tap water causes health problems lead to significantly greater consumption of bottled and significantly less tap water consumption. In order to examine these choices in a multivariate framework, they estimate a multinomial logit model.

Key factors yielding higher probabilities of a respondent being primarily a bottled water drinker (relative to the choice of tap water) include: higher income, unpleasant taste experiences with tap water, non French speaking, and being a male with children in one’s household. Similar factors yield higher probabilities of a respondent being primarily a filtered tap water drinker. An important finding is that two key variables linking a person’s health perceptions regarding tap water quality are significant factors leading to the choice of either filtered tap water or bottled water over tap water. They are: a variable showing the degree of health concerns a respondent has with respect to tap water and a second variable indicating whether the respondent believes bottled water to be safer than tap water.

G.B.Karthikeyan, and T.M.R Surya Vardhan (2010)\textsuperscript{61} in their article entitled “Consumer’s attitude and perception towards packaged drinking water with special

\textsuperscript{60} Diane Dupont, “Differences in Water Consumption Choices in Canada: the Role of Socio-demographics, Experiences, and Perceptions of Health Risks”, Department of Economics, Brock University, August 2009

\textsuperscript{61} G.B.Karthikeyan, T.M.R Surya Vardhan, “Consumer’s attitude and perception towards packaged drinking water with special reference to Virudhunagar Town”, 2010. Available at www.indianmba.com/Faculty_Column/FC1226/fc1226.html
reference to Virudhunagar Town”, found that among 113 males respondents, 50 males were influenced by the attribute brand, 38 males were influenced by quality and 45 were influenced by price, package size and quantity respectively. They added that it is interesting that respondents who were taken for study were aware of packaged drinking water and 60 respondents were aware by advertisement, 40 have got awareness by friends and the remaining of 50 have got awareness by family and doctor. Among 150 respondents 51 respondents prefer pet bottles and from the 51 respondents 43 were convenient in using pet bottles and other 8 were not convenient with containers and among 99 respondents prefer bubble top, 94 respondents were convenient and other 5 were not convenient. It could be understood that the factor Health has secured first rank with the an average of mean of 5.49, second, third, fourth ranks are secured by the factors like Brand name, Price, Physical characteristic with the average mean of 5.13, 4.98 and 4.12 respectively and fifth, sixth, seventh ranks are secured by the factors like Easy availability, Advertisement, Attractive package with the average mean of 6.07, 3.04 and 2.18 respectively. In the study it could be understood that health is the majority factor influencing in purchase of packaged drinking water.

O. Oyedeji et al., (2010) in their article said that continuous increase in the sale and indiscriminate consumption of packaged drinking waters in Nigeria is of public health significance. One hundred and eight samples comprising 16 bottled and 20 sachet water brands purchased randomly all over Ibadan and Ile-Ife cities in South Western Nigeria were analysed for presence of bacterial indicators of water quality. Total heterotrophic bacteria plate counts (HPC) ranged from 2 to 150 for bottled water and 5 to 200 for sachet water brands. One brand of bottled water and eight brands of sachet water had mean HPC greater than 100 per millilitre water and thus fell below the United States Environmental Protection Agency (USEPA) and World Health Organisation (WHO) drinking water standard of 100 HPC per millilitre water. Total coliforms and Escherichia coli were detected in only one brand of bottled water. All brands of sachet water (100%)

---

had total coliforms, four brands (20%) had presence of *E. coli* while *Enterococcus faecalis* was recovered from two (10%) of the brands. Most of the sachet water brands fell below WHO drinking water standards and are therefore of doubtful quality. Efforts need to be intensified in the monitoring of activities in this rapidly expanding industry with a view to raising standards.

**Marguerite Kaye Huber (2010)**[^1] in his study indicates that the anti-bottle crowd is not the only group to be up in arms, the religious sector is too. Clean drinking water, like air, some religious leaders argue, is a God-given resource that shouldn’t be packaged and sold. Others have gone further and declared that drinking bottled water is immoral and even a sin. It is hardly one of the Ten Commandments, but a good point nonetheless. They need the full support of local, state, and federal governments to understand that it is their job to protect their water. Maude Barlow, of the Blue Planet Run Foundation and Sara Ehrhardt, National Water Campaigner of the Council of Canadians says, “The solution lies in declaring water as a human right and a public trust to be guarded by all levels of government; in sharing information and best practices on our public water systems; and in overseeing and protecting our public drinking water for future generations,“

Protection has to start at the top of government with a push from the bottom. The production of bottled water is causing residents harm, such as in the case of Flint Hills, and our environment harm. They have a right to a healthy environment too; particularly one where water is abundant and available to everyone, but that is not the case. “Meanwhile, across the nation and around the globe, rising temperatures, population growth, drought, and increased pollution and development continue to strain water resources- its distribution, availability, and quality. The coming scarcity will hurt the growth of jobs, housing, and businesses. The future use of water will affect more than how much we get to drink; it will define our lives and how countries are run.

Devendiran (2010)\(^{64}\) in his study stated that now-a-days successful companies have recognized that the marketing environment is constantly spinning new opportunities and they environment the marketed should also identify the consumer information source and evaluate their relative communication for the target market companies must work to ensure customer satisfaction at all level of the buying process because after the satisfaction of customers the companies give due considered for profit today more companies are recognizing the importance of satisfying retaining current customers. The study focuses on the purchase behaviour and customer satisfaction of pure it water purifier. It is little attempt made by the researcher to bring the product satisfaction of the customer with respect to the products performance and the after sales services rendered by the company the respondents are satisfied with all aspects.

John (2010)\(^{65}\) in his article made an attempt to find the reasons for many companies to invest in producing bottled water from the viewpoint of the customers. The study revealed that many companies launched their brands of bottled water in view of good response from their customers.

Eric Teillet, et al. (2010)\(^{66}\) in their study investigated the potential contribution of the specific mineral contents of the different water samples. However, they found that, the quantity of most minerals was found highly correlated with the global mineralization (TDS). In addition, sensory differences between the water samples were too small to highlight the influence of some specific minerals in the taste of water. Finally, the study highlighted the impact of TDS in the taste of water, but other factors such as contaminants or minerals, individually, can also influence the perception of the taste of water. It has been demonstrated in the study that most consumers cannot distinguish between bottled water and tap water when the latter is chlorine-free.

However, 36\% of the subjects were found to be able to distinguish between tap water and bottled water and the reasons were not identified. In addition, it was not possible to investigate individual preference because of the missing values induced by the

---

\(^{64}\) Devendiran, “A study on consumer satisfaction level of pure it water purifier in Udumalpet town”, Vidyasagar College of Arts and Science, Udumalpet, September 2010


protocol. This should be studied through a dedicated experiment. Finally, the gap between preferences and behaviour has been emphasized and tend to prove the influence of other factors rather than those linked to sensory perception. Beyond physiological or habitual considerations, information and education could be a way to potentially change consumer perception, preference and behaviour.

Richard (2011)\textsuperscript{67} in his article examined the sales increase of bottled water from 2007-2010, the study revealed that the bottled drinking water continued to perform well in all the three years. It was also observed that the sales increase may be due to change in the attitudes of customers towards maintaining their health. The research was able to address by means of analyzing both the customers and the retailers.

Amber Saylor, Linda Stalker Prokopy, Shannon Amberg (2011)\textsuperscript{68} in their article entitled “What’s wrong with the Tap? Examining Perceptions of Tap Water and Bottled Water at Purdue University”, stated that environmental impacts of bottled water prompted us to explore drinking water choices at Purdue University, located in West Lafayette, IN. A random sample of 2,045 Purdue University students, staff, and faculty was invited to participate in an online survey. The survey assessed current behaviours as well as perceived barriers and benefits to drinking tap water versus bottled water. 677 surveys were completed for a response rate of 33.1%. Then they conducted qualitative interviews with a purposive sample of university undergraduates (n = 21) to obtain contextual insights into the survey results and the beliefs of individuals with a variety of drinking water preferences. This study revealed that women drink disproportionately more bottled water than men while undergraduate students drink more than graduate students, staff and faculty.

The study also uncovered a widespread belief that recycling eliminates the environmental impacts of bottled water. Important barriers to drinking tap water at Purdue include: perceived risks from tap water and the perceived safety of bottled water, preferring the taste of bottled water, and the convenience of drinking bottled water.

The qualitative interviews revealed that drinking water choices can be influenced by several factors especially whether individuals trust tap water to be clean but involve varying levels of complexity. Significant differences were also found between campus groups undergraduate students, graduate students, staff, and faculty ($\chi^2 = 42.14$, $P<0.001$). Undergraduate survey respondents ($n = 200$) consumed an average of 6.9 bottles of water per week ($SD = 8.8$) two bottles more than the mean for all respondents. Staff members were the second highest consumers of bottled water, with a mean of 4.5 bottles per week ($SD = 6.5$), but were also the most diverse in their drinking water choices; 38% of staff were non-users of bottled water, while 24% were moderate users and 20% were heavy users. In contrast, a majority of faculty and graduate students did not drink bottled water, 55% and 54% respectively. In keeping with the differences between groups on Purdue’s campus, there was a significant negative relationship between a respondent’s age and the amount of bottled water they reported consuming ($r = -0.132$, $P<0.01$). Therefore, younger respondents tended to drink more bottled water than older respondents. There were no significant differences in bottled water consumption based on a respondent’s race or political views.

Lina Huerta-Saenz et al., (2011) in their article “Tap or Bottled Water: Drinking Preferences among Urban Minority Children and Adolescents”, stated that the last decade saw an increasing trend in consumer preference of bottled water over tap water. Little is known what type of water children and adolescents prefer for drinking and what their parents think of their community tap water. The study objective was to assess drinking water preferences, perceptions of the qualities of tap water and bottled water, and fluoride knowledge in an urban paediatric population. They conducted an anonymous survey of a convenience sample of caretakers of children and adolescents at an urban clinic regarding their preferences for tap or bottled water, their perceptions of the quality of tap and bottled water and their knowledge of fluoride. Of the 208 participants (79% African American, 9% Latino), 59% drank tap water, 80% bottled water. Only 17% drank tap water exclusively, 38% drank bottled water exclusively, 42% drank both. They found no significant differences in water preferences across age groups, from infancy to adulthood, or among ethnic groups. Ratings for taste, clarity, purity and safety

---


Please purchase PDF Split-Merge on www.verypdf.com to remove this watermark.
were significantly higher for bottled water than tap water (P<0.001). Only 24% were aware of fluoride in drinking water.

They conclude bottled water was preferred over tap water in an urban minority paediatric population. Perceptions of the qualities of water seemed to drive drinking preferences. Public health strategies are needed to increase public awareness of the impact of bottled water consumption on oral health, household budgets and the environment. In conclusion, bottled water was preferred over tap water among all age groups in an urban African-American paediatric population, not only for drinking but also for infant formula preparation. Rankings for the qualities of water were much higher for bottled water than for tap water. In addition, awareness of fluoride content in drinking water was very low. These findings have implications for children’s oral health, household budgets and tax dollars, and the global environment. Next steps include increased enforcement of governmental policies for similar safety standards for tap and bottled water, including mandated labelling of bottled water; development of evidence based recommendations by health professionals’ societies for safe and healthy water use in children; and public health education efforts to increase awareness of the impact of bottled water consumption on oral health, finances and the environment.

**Lucy A. Semerjian (2011)** in his article entitled, “Quality assessment of various bottled waters marketed in Lebanon”, stated that thirty-two domestic bottled water brands were analyzed for various physico-chemical as well as bacterial water quality parameters. Recorded results were compared with the Lebanese Standards Institution standards of quality and standards of identity as well as various international water standards for bottled waters. Results showed in the characteristics of investigated bottled waters, yet the majority met the different bottled water standards for physicochemical parameters except for pH (4 brands), hardness (2 brands), and calcium (2 brands). All samples showed negative growth for fecal coliforms, yet 18.8% (N = 6) and 59.4% (N = 19) of the samples revealed positive results for total coliforms and heterotrophic plate count at 37°C, respectively. Generated Piper diagrams revealed that the majority of investigated waters are
of calcium–magnesium bicarbonate type; some brands were rich in sodium–potassium chloride, and few were of the mixed type. Comparison of the study results with reported label values indicated good agreement with stated pH values but considerable variation for dry residue, Mg, Na, K, Ca, Mg, HCO3, Cl, and SO4. Thirty-two domestic bottled water brands were analyzed for various physico-chemical as well as bacterial water quality parameters.

Results showed a widespread variations in the characteristics of investigated bottled waters, yet the majority met the various national and international bottled water standards for physico-chemical parameters except for pH (4 brands), hardness (2 brands), and calcium (2 brands). All the samples showed negative growth for fecal coliforms, yet 18.8% (N = 6) and 59.4% (N = 19) of the samples revealed positive results for total coliforms and HPC at 37°C, respectively. Generated Piper diagrams revealed that the majority of the investigated waters are of calcium–magnesium bicarbonate type, some brands were rich in sodium–potassium chloride, and a few were of the mixed type. Comparison of the study results with reported label values indicated good agreement with stated pH values but considerable variation for dry residue, Mg, Na, K, Ca, Mg, HCO3, Cl, and SO4. Identification labels showed varying compliance with the Lebanese Standards Institution standards of identity. The study covers a limited number of bottled waters contained in up to 10-L containers marketed in Lebanon; it is recommended that all marketed bottled waters be monitored for quality and identity and be licensed by authorities concerned to safeguard consumers’ health.

R.Anitha (2011)71 in her study entitled, “A study on customer preference toward packaged water in Karur city”, stated that the people’s consumption of packaged water has increased considerably. To attract consumers, the companies producing packaged water give advertisements and have good distribution network for marketing the same. The study aimed at bringing out perception of consumers towards the purchase and consumption of packaged drinking water. Many consumers living in urban areas today use packaged drinking water as a mean of meeting their daily requirements. Potential health is the main reason for purchasing packaged mineral waters.

Mineral water is beneficial to the consumers because the mineral content of the water can be very easily absorbed by the body as compared to the mineral content of the food. She added that majority of the consumers consume Aquafina mineral water and considerable number of respondents use Bisleri as an alternative brand. Majority of the respondents feel that mineral water is necessary. Most of the buyers consume packaged water for protecting their health and hygiene. Majority of the respondents opine that they have not come across any problem while using packaged water.

Ayokunle C Dada (2011)\textsuperscript{72} in his article “Packaged water: optimizing local processes for sustainable water delivery in developing nations”, says Packaged water made available in sachets, like other local initiatives offer substantial hope in contributing to increased sustainable access in rural and urban settings of developing nations if acknowledged and improved upon. The call is therefore made to intervening global communities and developmental organizations for the need to learn from and build on the local processes that already operate in the developing world. Room for optimum improvement, via collaborative efforts with relevant stakeholders will demand striking a suitable balance between two preferred options: promoting public health (through improved regulation of the packaged water industry) while concurrently improving social welfare (encouraging access through support of these initiatives that cover for institutional inadequacies in public water supply coverage). With so much global attention and commitment towards making the Water and Sanitation targets of the Millennium Development Goals (MDGs) a reality, available figures seem to speak on the contrary as they reveal a large disparity between the expected and what currently obtains especially in developing countries.

As studies have shown that the standard industrialized world model for delivery of safe drinking water technology may not be affordable in much of the developing world, packaged water is suggested as a low cost, readily available alternative water

\textsuperscript{72} Ayokunle C Dada, "Packaged water: optimizing local processes for sustainable water delivery in developing nations", Dada Globalization and Health, 2011, Available at http://www.globalizationandhealth.com/content/7/1/24
provision that could help bridge the gap. Despite the established roles that this drinking water source plays in developing nations, its importance is however significantly underestimated, and the source considered unimproved going by ‘international standards’. Rather than simply disqualifying water from this source, focus should be on identifying means of improvement. The need for intervening global communities and developmental organizations to learn from and build on the local processes that already operate in the developing world is also emphasized. Identifying packaged water case studies of some developing nations, the implication of a tenacious focus on imported policies, standards and regulatory approaches on drinking water access for residents of the developing world is also discussed.

Zhihua Hu et al., (2011) in their article “Bottled Water: United States Consumers and Their Perceptions of Water Quality”, say that water is essential to human health and life. Access to safe water supplies and affordability are central concerns of public health and individual consumers. In this study they find that perceptions of ground water quality and local water supply safety are associated with decisions to purchase bottled water versus use public water systems for drinking water. When local water is not considered safe or of high quality U.S. consumers are more likely to use bottled water as a primary water source. Furthermore, negative perceptions of safety increase the likelihood of consumer frequently purchasing bottled water regardless of whether their primary source of drinking water is a small water system or large municipal water supply system. Two key implications of their findings are that (1) public health officials and community leaders need to work to assure that public municipal drinking water supplies are safe; in addition, they should find effective ways to communicate to local residents the safety of their water supply; and (2) environmental leaders and activists need to campaign about the long-lasting impacts of plastic water bottles. Further, the public must be engaged in understanding the relationship of water quality to the capacity of local water systems to maintain safety and good taste standards.

---

Consumer distrust of their groundwater quality should be leveraged to create community action to address legitimate concerns. Hypothesis about environmental attitudes was not supported by the data. The relationship between environmental attitudes and bottled water use was not significant. Consumers with stronger overall concern about the environment do not seem to transfer this concern to pollution and waste problems associated with purchasing bottled drinking water. But again, because of the relatively longer cycle of research using multistage data, our data might not be able to reflect the newest trend of national environmental concern on bottled water. Finally, the hypothesized regional effect regarding bottled water use was confirmed by the data. Residents of the Midwest and west mountain regions were far less likely to use bottled water for either primary drinking purpose or other occasions of regular uses, while residents of the southern pacific, the south, and the southeast were all equally likely to be bottled water users. This suggests that other variables such as culture, actual water quality conditions, media coverage of water issues and other place specific factors may be influencing the decision to use bottled water versus tap water from a private or public system. Water resource quantity and income might also be driving forces for the differences. Further research is needed to better explain regional variations.

Ogbuji, and Chinedu (2011)\textsuperscript{74} in their study found that Branding is one of the most intriguing marketing strategies used for the purpose of winning or overcoming competition; its efficacy is not in doubt. This study investigated the impact of branding on consumer choice for bottled water, with special focus on the contributory roles of its various elements in impacting consumer behaviour. It was discovered among other things, that of all the elements of branding, company-of-make and packaging play a greater role than brand name and brand mark, in terms of influencing consumer choice for bottled water. It equally recommended among other things that firms should focus more attention on the company name and packaging but should also integrate brand name and brand mark as supportive elements in fashioning an effective branding strategy for

beating competition. More emphasis should equally be laid on institutional rather than brand advertising.

Vinicius Brei and Steffen Bohm (2011) in their paper, they aim to address this gap by critically engaging with marketing campaigns of so-called ‘Sethical’ bottled water. They especially focused on a major CSR strategy of a range of different companies that promise to provide drinking water for (what they name as) ‘poor African people’ by way of Western consumers purchasing bottled water. Following Fairclough’s approach, they unfold a three-step critical discourse analysis of the marketing campaigns of 10 such ‘ethical’ brands. Their results show that bottled water companies try to influence consumers’ tastes through the management of the cultural meaning of bottled water, producing a more ‘ethical’ and ‘socially responsible’ perception of their products/brands. Theoretically, they base their analysis on McCracken’s model of the cultural meaning of consumer goods, which, they argue, offers a critical perspective of the recent emergence of CSR and business ethics initiatives.

They discuss how these marketing campaigns can be framed as historical struggles associated with neo-liberal ideology and hegemony. Their analysis demonstrates how such CSR strategies are part of a general process of the reproduction of capitalist modes of accumulation and legitimating through the usage of cultural categories.

They have argued that it was precisely through this process of cultural signification that companies are able to differentiate themselves from their competitors in the hope of gaining an advantage in an increasingly saturated market and distract from attacks on their environmental performance. Instead of addressing these attacks directly for example, by reducing the environmental impact of their products bottled water companies have turned to cause-related marketing in order to improve the image of their brands through ‘doing good’ in the so-called ‘developing world.’ That is, the marketing appeal is not directed only at ‘ethical’ consumers. The practice of ‘ethical’ consumption is now an invitation extended to all customers, which confirms the findings of the Response team of the researcher who have claimed that ‘ethics-in-action’ strategies are evidence of a wider shift from a negative conception of CSR (do no harm) to a positive one. The act of consuming bottled water

---

becomes the material expression of a cultural disposition through which one can articulate one’s desires for ethics, charity, help and more generally perhaps a better world.

**Joanna Galvez (2011)** concluded that bottled water was the primary source of drinking water for almost all households. Living Waters for the World consumers were more likely than non-consumers to cite price as a reason they preferred a specific brand of bottled water. Living Waters for the World consumers were also more likely to use bottled water for other purposes besides drinking, namely, cooking, preparing food, and brushing their teeth compared to non-consumers. Overall, there were some interesting findings but due to the small sample, it was difficult to perform further analyses. The author speculates that further study is needed with a larger, randomized sample. Qualitative studies can explore more in depth the reasons Living Waters for the World consumers prefer to drink their water. The findings from this research can be used to scale up similar interventions, and set up SWEs that fit with the community consumption practices.

**Yvone Lieketseng Liee (2011)** discussed that bottled water, like any drinking water used for human consumption, should be safe and wholesome to ensure adequate public health protection. This is due to potential health effects of concern such as endocrine disruption, toxicity teratogenicity, mutagenicity and carcinogenicity. Despite the number of regulatory bodies, publications on bottled water and speculations on its public health significance, many questions remain to be answered. One of the questions is whether the shelf life of bottled water is a cause for concern. The aim of the study was to determine the shelf-life of various commercial bottled waters by monitoring the variation in microbiological, chemical and aesthetic qualities of bottled water.

**Marina Leigh Foote (2011)** Overconsumption in developed economies undoubtedly puts a large strain on the environment, and many would argue that the damage is irreversible. Current uses and rates of consumption of freshwater resources are also deemed to be unsustainable. A large contributor to the high demand for water is the shift in consumer

---

preferences from tap to bottled water. In the last few decades, bottled water companies have set unprecedented records, surpassing all other types of non-alcoholic beverages to become the second largest beverage market next to soda. Bottled water has been on the rise due to its supposed safety, purity and convenience. Municipal tap water companies have little to no incentive for disproving these theories since tap water continues to be used for nondrinking purposes. Meanwhile, bottled water companies are spending millions of dollars in appealing advertisements, which further fuels distrust of tap water providers.

**Anette Veidung (2011)** With the largest bottled water market, Europe, maturing and competition intensifying it becomes increasingly important for the actors to stand out to the consumer. In order to stand out and capture the consumers’ attention the bottle design becomes an important mean of differentiation. Especially because consumers’ tend to scan shelves in order to find the product that pops. Furthermore, when confronted with a bottle design the consumer will have a perception about its quality and an intention of purchase. The purpose of this thesis is thus to uncover the relationships between bottled water’s design and the consumers’ perception of the quality of the water contained in the bottle as well as consumers’ purchase intention. Furthermore, this thesis also investigates how these initial decisions are affected through the introduction of additional information about the bottled water’s country of origin followed by the bottle’s brand.

From the earlier studies it is observed that there is no note worthy studies which carefully documented the consumers' perception and environmental awareness towards packaged drinking water. Moreover academic researcher were not evaluated the attitude of dealers perception towards packaged drinking water business in Indian perceptive. Hence the researcher had made an attempt in fill the research gap.

---

79 Anette Veidung “What you see is what you choose” An Analysis of a Bottled Water’s Design, Source and Brand and its Influence on Perceived Quality and Purchase Intention, anette_veidung . pdf